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ABSTRACT

This programed instruction study guide is one of a series that form a first-year algebra course. Structured in a multiple-choice question-answer format with scrambled pages, it is intended to be used in conjunction with a computer-managed instructional system. The following topics are covered in Volume 13: open sentences in two variables, coordinates in a plane, graphing linear equations, slope of a line, slope-intercept form of an equation, graph of an inequality in two variables, and graphic solution of a system of equations. Reading and homework assignments are taken from the text "Modern Algebra - Book I" by Dolciani. (Related documents are SE 015 854 - SE 015 870.) (DT)

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PROGRAMMED MATH CONTINUUM

level one

ALGEBRA

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VOLUME

13

NEW YORK INSTITUTE OF TECHNOLOGY
OLD WESTBURY, NEW YORK

ED 075214

PROGRAMMED MATH CONTINUUM

LEVEL ONE

A L G E B R A

VOLUME 13

New York Institute of Technology

Old Westbury - New York

PREFACE

This volume is one of a set of 18

that form a complete course

in

ALGEBRA - LEVEL ONE

The volume has been structured

in a multiple choice question-answer format,

with the pagination scrambled

and

is to be used in conjunction with

a program control console

utilizing

punch card input.

It is one exhibit in the demonstration of a model

developed under the direction of

the U.S. Department of Health Education and Welfare

Project 8-0157

at the

New York Institute of Technology

Westbury, New York

VOLUME 13

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IN THE STUDY GUIDE:

QUESTION:	SEGMENT:	IS ON PAGE
1	1	$\frac{1}{1}$
1	2	$\frac{35}{2}$
1	3	$\frac{70}{1}$
1	4	$\frac{100}{1}$
1	5	$\frac{120}{1}$

C

VOLUME 13

This volume covers the following material as shown in this excerpt from the Syllabus:

SEGMENT	DESCRIPTION	REFERENCE BOOK SECTION		
		DOLCIANI	DRESSLER	DODES
1	Open sentence in two variables	9-1	15-3	
2	Coordinates in a plane	9-2	15-1	6-2
	Graph of a linear equation	9-3	15-2 15-4 15-5 15-6	6-4 6-5 6-6
3	Slope of a line	9-4*	15-7	6-4
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4	Graph of an inequality in two variables	9-7	15-12	6-12
5	Graphic solution-system of of equations	10-1	16-1	6-8

* OPTIONAL TOPIC

READING ASSIGNMENT

VOLUME 13

Before you begin to answer the questions in this STUDY GUIDE you should read the pages indicated.

SEGMENT	FROM PAGE	TO PAGE
1	333	337
2	337	343
3	343	348
4	350	353
5	367	370

Modern Algebra - Book I
Dolciani, Berman and Freilich
Houghton Mifflin Co.
1965

Read EVERYTHING contained in these pages.

EXAMINE every illustrative problem

Write in your NOTEBOOK:

1) Every RULE that has been stated
2) Every DEFINITION that has been presented
3) Solve at least ONE PROBLEM of each type covered in the lesson.

If you wish additional information for enrichment purposes consult:

Algebra I
Dodes and Greitzer
Hayden Book Co.
1967

You will be given additional notes at various places in the STUDY GUIDE. These, too, should be entered in your NOTEBOOK.

E

HOMEWORK ASSIGNMENT

VOLUME NO. 13

BOOK: DOLCIANI

The following assignment can be done as you progress through this volume. You will be reminded to do the problems as you finish each segment.

NOTE:

The completed assignment, properly labeled and on looseleaf paper, as mentioned in the original homework instructions, must be submitted to your teacher BEFORE you take the VOLUME UNIT TEST.

HOMEWORK QUESTION NO.	PAGE NO.	EXAMPLE NUMBER
1	336	7
2	336	11
3	336	13
4	337	27
5	342	1
6	342	9
7	342	12
8	342	14
9	352	A 2
10	352	A 7
11	352	A 12
12	353	15
13	370	3
14	370	5
15	370	8
16	370	12
17	345	13
18	346	8
19	346	17
20	348	14

GENERAL INSTRUCTIONS

Ask your teacher for:

PUNCH CARD
PROGRAM CONTROL
ANSWER MATRIX

When you are ready at the PROGRAM CONTROL

Insert the PUNCH CARD in the holder
Turn to the first page of the STUDY GUIDE
Read all of the instructions
Read the First Question

Copy the question
Do your work in your notebook
Do all of the computation necessary
Read all of the answer choices given

Choose the Correct answer
(remember, once you've punched the card it can't be changed)

Punch the card with the STYLUS

Read the instruction on the PROGRAM CONTROL
(it tells you which page to turn to)

TURN TO THAT PAGE:

If your choice is <u>not correct</u> you will be given additional hints, and will be directed to return to the question and to choose another answer.

If your choice is <u>correct</u> then you will be directed to proceed to the next question located immediately below, on the same page.

If you have no questions to ask your teacher now, you can turn the page and begin. If you have already completed a SEGMENT turn to the beginning of the following segment;

CHECK THE PAGE NUMBER BY LOOKING A THE TABLE OF CONTENTS

1/1

Volume 13 Segment 1 begins here:

Obtain a PUNCH CARD from your instructor. In addition to the other identifying information that must be furnished by you, you are asked to punch out the following:

COLUMNS	48 and 50	1 6	(Sequence Number)
	54 and 56	0 4	(Type of Punch Card)
	60 and 62	1 3	(Volume Number)
	66 and 68	0 1	(Segment Number)

Your READING ASSIGNMENT for this Segment is pg: 333 - 337
You will now be asked a series of questions to draw your attention to the more important points.

You have read in your textbook about writing equations to solve verbal problems. One of the main difficulties is choosing the letters to represent the variables and stating the exact meaning of the substitution.

Question 1

Consider problem A: John's father is 5 inches shorter than twice John's height.

Which is the best way to define the variable " h " ?

(A) the number of inches in John's height

(B) the number of feet in John's height

(C) John's height

(D) the number of yards in John's height.

1/2

That answer is not right

Twice y must be translated as 2y

Return to page 10/1 and try question 7 again.

$\frac{2}{1}$

Does this choice mean that "f" represents the father's name his age, his bank balance, the number of his children? It is necessary to be specific.

Return to page $\frac{34}{2}$ and try question 2 again.

$\frac{2}{2}$

This choice is not the right answer.

The phrase "exceeds n by" , means "is n increased by". The "y exceeds n by 1," means "y is n, increased by 1." In algebra, it would be: y = n + 1. Remember that is must be translated as =.

Return to page $\frac{9}{1}$ and try question 8 again.

$\frac{2}{1}$

Wrong answer.

The minus sign means "decreased by."

Therefore this choice says .... "decreased by 2m."

Return to page $\frac{21}{1}$ and try question 9 again.

$\frac{3}{2}$

This choice is correct.

Now proceed to <u>question 11</u> which follows:

Which of the following do you recognize as stating that the "x value is 5" and the "y value is 2 ?"

(A) (5,2)

(B) (2,5)

(C) (5+2)

(D) (2+5)

$\frac{4}{1}$

It is important to subtract in the correct order. Your answer states that the father's height is less than 5 inches by the amount 2h. Not only is that a statement you certainly didn't intend to make, but it disagrees with the statement of the problem.

Return to page $\frac{14}{1}$ and try question 3 again.

$\frac{4}{2}$

Wrong answer

The value of x is 2 and the value of y is 3. If you used these values to calculate w , perhaps you need to review the fact that "2-3" means ADD the numbers 2 and -3. If necessary, review your rules for adding signed number, as you found them in Volume 5, Segment 1.

Return to page $\frac{29}{2}$ and try question 12 again.

$\frac{5}{1}$

The question mentioned half. Your choice had no 1/2 in it and is therefore not right.

Return to page $\frac{25}{1}$ and try question 10 again.

$\frac{5}{2}$

In order to solve for y, y must be alone on one side of the equation. Since the term "2x" is on the same side of the equation with y it must be removed by a process of algebra. By what process is "2x" attached to y ? The inverse process applied to both sides will leave y alone.

Return to page $\frac{30}{1}$ and try question 13 again.

$\frac{6}{1}$

This choice is correct.

Now proceed to question 5 which follows:

Question 5

The sum of \$5.60 consists of quarters and dimes. If n represents the number of quarters, state how to represent the value, in cents, of all the quarters.

(A) 25 + n

(B) 25n

(C) .25 + n

(D) .25n

$\frac{6}{2}$

Try substituting 3 for x in the equation 2x + y = 12

Then solve for y

If you prefer to solve for y immediately you should get

y = 12 - 2x.

Return to page $\frac{17}{2}$ and try question 16 again.

$\frac{7}{1}$

The order in which the coordinates are listed is important.

Why is your order wrong?

Return to page $\frac{3}{2}$ and try question 11 again.

$\frac{7}{2}$

This choice is not the right answer.

If you subtracted $2x$ from both sides of the equation, you should have gotten $-y = 6 - 2x$. However, you were asked to solve for y, that is $+y$. Therefore you must perform an operation so as to change the sign of $-y$ to $+y$.

Return to page $\frac{19}{2}$ and try question 14 again.

$\frac{8}{1}$

In order to get the value of a number of dimes, it is necessary to multiply the number of dimes by the value of each dime. Be sure to use the correct units.

Return to page $\frac{39}{1}$ and try question 6 again.

$\frac{8}{2}$

This choice is correct.

Now proceed to question 17 which follows:

Question 17

If $x \in \{-1, 1, 3\}$ and $x + 2y = 5$, apply the principles of solving equations to find "y". Then the solution set for "y" is

(A) $\{-1, 3, 7\}$

(B) $\{1, 2, 3\}$

(C) $\{-3, -2, -1\}$

(D) $\{0, 2, 4\}$

This choice is correct.

Now proceed to question 8 which follows:

Question 8:

Choose the equation which expresses the relation that Barbara's average exceeds Ann's average by 20, where "b" represents Barbara's average, and "a" represents Ann's average.

(A) $b = a + 20$

(B) $b + a = 20$

(C) $b = a - 20$

(D) $b + 20 = a$

Wrong answer.

You have made a mistake in signs.

Return to page $\frac{36}{1}$ and try question 15 again.

$\frac{10}{1}$

This choice is correct.

Now proceed to question 7 which follows:

Question 7:

Choose the equation which expresses the relation:

x increased by twice y is 7.

(A) $2x + y = 7$

(B) $2x + 2y = 7$

(C) $x + 2y = 7$

(D) $x = 7 + 2y$

$\frac{10}{2}$

This choice is not correct.

You were asked for all the ordered pairs which are solution sets of the equation. The ones you have obtained are correct, but which have you missed ?

Return to page $\frac{44}{2}$ and try question 19 again.

$\frac{11}{1}$

Wrong answer.

The process of solving equations involves applying an inverse process to remove a quantity from where it is not wanted. Since $2x$ was not multiplied by anything, no division by $2x$ should be performed.

Return to page $\frac{19}{2}$ and try question 14 again.

$\frac{11}{2}$

Wrong answer.

In looking for solutions, consider the following:
If x is a positive integer, its smallest possible value is 1. But, since $2x$ plus something is 9, it follows that $2x$ is smaller than 9. Therefore, the largest value that x can have is 4. Now that you know the possible values for x, you can attempt to find the y values.
After you have found all the solution sets, be sure to read the question again.

Return to page $\frac{20}{2}$ and try question 20 again.

$\frac{12}{1}$

Although it is possible to represent John's height in feet or yards, it is better to consider the units that are mentioned in the problem, since all variables in a problem should be related to the same type of unit.

This is not the best definition for "h".

Return to page $\frac{1}{1}$ and try question 1 again.

$\frac{12}{2}$

$2x$ is a translation of twice x, which was not called for in the problem. Therefore $2x$ is incorrect. Twice y was in the problem, however.

Return to page $\frac{10}{1}$ and try question 7 again.

It is necessary that each quantity specify the units involved. What units will you use to express the father's height ?

Return to page 34/2 and try question 2 again.

Wrong answer.

The phrase "exceeds n by" means "is n increased by". How would you translate your choice into words ?
It would be: "b is less than a by 20."

Return to page 9/1 and try question 8 again.

$\frac{14}{1}$

This choice is correct.

Now proceed to question 3 which follows:

Question 3

Choose the equation which expresses the relationship in the problem "John's father is 5 inches shorter than twice John's height."

(A) $f = 5 - 2h$

(B) $f = 2h - 5$

(C) $f = 2h + 5$

(D) $f = 5 + 2h$

$\frac{14}{2}$

This choice is not correct.

The minus sign means decreased by. Therefore this choice says ..... decreased by m.

Return to page $\frac{21}{1}$ and try question 9 again.

The plus sign indicates " greater than ". A minus sign is needed to express " less than ".

Return to page 14/1 and try question 3 again.

You should consider $x - y$ as meaning ADD the value of x to the negative of the value of y. If necessary, review your rules for adding signed numbers as you found them in Volume 5, Segment 1.

Return to page 29/2 and try question 12 again.

16/1

Wrong answer.

The question called for 2 more than 1/2 of ..... Your choice has 1/2 of 2 more than .....

Return to page 25/1 and try question 10 again.

16/2

Wrong answer.

You cannot remove 2x from the left side of the equation by division; since it has been added on, only the inverse operation to addition can remove it.

Return to page 30/1 and try question 13 again.

Wrong answer.

In order to get the value of a number of quarters, it is necessary to multiply the number of quarters by the value of each quarter. Be sure to use the correct units.

Return to page 6/1 and try question 5 again.

This choice is correct.

Now proceed to question 16 which follows:

Question 16:

Apply the principles of solving equations to find the value of y when $x = 3$ in the equation $2x + y = 12$.

(A) 6

(B) 2

(C) 4.5

(D) -6

$\frac{18}{1}$

This choice is not the correct answer.

An ordered pair of numbers is indicated by placing two numbers within parentheses, separated by a comma. The plus sign means that you have only a single quantity, not a pair.

Return to page $\frac{3}{2}$ and try question 11 again.

$\frac{18}{2}$

Wrong answer.

Somewhere you have made an error in signs. Check your calculations.

Return to page $\frac{19}{2}$ and try question 14 again.

$\frac{19}{1}$

This choice is not correct.

The value of a dime is .10 when expressed in dollars, but it is 10 when expressed in cents. The question asked for the number of cents in the value.

Return to page $\frac{39}{1}$ and try question 6 again.

$\frac{19}{2}$

This choice is correct.

Now proceed to question 14 which follows:

Question 14:

Apply the principles of solving equations to transform the equation $2x - y = 6$ into an equation solved for "y."

(A) $y = 6 - 2x$

(B) $y = 6 + 2x$

(C) $y = \frac{-3}{x}$

(D) $y = 2x - 6$

$\frac{20}{1}$

Wrong answer.

It is necessary to divide every term on both sides of the equation; if you choose to divide.

Return to page $\frac{36}{1}$ and try question 15 again.

$\frac{20}{2}$

This choice is correct.

Now proceed to question 20 which follows:

Question 20:

If $2x + 3y = 9$, and x and y are positive integers, apply the principles of solving equations to find how many ordered pairs are solutions of the equation.

(A) none

(B) 1

(C) 2

(D) 3

This choice is correct.

Now proceed to question 9 which follows:

Question 9:

Choose the correct representation of a number which is twice "m", decreased by "w".

(A) $2(m - w)$

(B) $w - 2m$

(C) $2 (w - m)$

(D) $2m - w$

The abscissa is the distance to the right or left from the origin, and the ordinate is the distance up or down.

Return to page $\frac{35}{2}$ and try question 1 again.

22/1

This choice is not the correct answer.

Did you perhaps put 3 as the value for y ? If you solve the equation directly for y , you should get y = 12 - 2x.

Return to page 17/2 and try question 16 again.

22/2

This choice is correct.

Now proceed to question 3 which follows:

Question 3

If the abscissa of a point is negative, where do you recognize that it might be ?

(A) in quadrant I

(B) on the Y axis

(C) on the X axis

(D) in quadrant IV

Wrong answer.

It is necessary that each quantity specify the units involved. What units would you use to express John's height ?

Return to page $\frac{1}{1}$ and try question 1 again.

Try to translate your answer back into words: it says " x is 7 increased by twice y " . That was not the wording of the problem.

Return to page $\frac{10}{1}$ and try question 7 again.

$\frac{24}{1}$

This would be a way to express the meaning of " f ." However all units in the problem should be the same. Since the problem mentions inches, what units should you use ?

Return to page $\frac{34}{2}$ and try question 2 again.

$\frac{24}{2}$

The phrase "exceeds n by" means "is n increased by." The word is translates into =.

How would you translate your answer into words ?

It would be " b increased by 20 is a ."

Return to page $\frac{9}{1}$ and try question 8 again.

This choice is correct.

Now proceed to question 10 which follows:

Question 10

Choose the correct representation of the number which is 2 more Than half the difference between x and y .

(A) $(x - y) + 2$

(B) $\frac{1}{2} (x - y) + 2$

(C) $\frac{1}{2} (x - y + 2)$

(D) $\frac{1}{2}x - y + 2$

Any point in quadrant I is to the right of the origin.

Therefore its abscissa could not be negative.

Return to page $\frac{22}{2}$ and try question 3 again.

$\frac{26}{1}$

This illustrates the fact that the order of ideas in English is not always the same as in algebra. Thus " 5 inches shorter than " translates as " -5 ". Therefore 2h - 5 is the correct algebraic translation for 5 less than twice John's height.

Proceed to question 4 below:

$\frac{26}{2}$

Question 4

Which are the proper ways to define each of the two variables in problem B ? " The sum of $5.60 consists of quarters and dimes ".

(A) the value of each quarter and the value of each dime.

(B) the number of quarters and the value of each quarter.

(C) the number of quarters and the number of dimes.

(D) the number of quarters and the value of each dime.

$\frac{27}{1}$

Wrong answer.

Your choice says "the difference between $\frac{1}{2}$ of x and y " whereas the question asked for $\frac{1}{2}$ of the difference between x and y . How should you write the expression so that "the difference between x and y " is a single quantity ?

Return to page $\frac{25}{1}$ and try question 10 again.

$\frac{27}{2}$

In order to get this result, you must have performed a multiplication. However, the problem did not call for any multiplication.

Return to page $\frac{29}{2}$ and try question 12 again.

$\frac{28}{1}$

This answer choice is not correct.

The value of a quarter is .25 when expressed in dollars, but it is 25 when expressed in cents. The question asked for the number of cents in the value.

Return to page $\frac{6}{1}$ and try question 5 again.

$\frac{28}{2}$

A look at the graph on which you have located these points will convince you that " P " is <u>not</u> to the right of " Q ". If you did not make a graph, this ought to convince you that it is a good idea.

Return to page $\frac{58}{2}$ and try question 4 again.

The x value is the first number of an ordered pair, and the y value is the second number. Therefore, this is the correct answer.

Proceed to question 12 below.

Question 12

If the ordered pair (2, 3) is a solution of the equation $x - y = w$, perform the necessary calculation to find the value of w.

(A) 1

(B) -1

(C) 5

(D) 6

$\frac{30}{1}$

This choice is correct.

Now proceed to question 13 which follows:

Question 13

Apply the principles of solving equations to transform the equation $2x + y = 8$ into an equation solved for y.

(A) $y = 4 - x$

(B) $y = \frac{4}{x}$

(C) $y = 2x - 8$

(D) $y = 8 - 2x$

$\frac{30}{2}$

Wrong answer.

Did you replace y by the members of the set $\{-1, 1, 3\}$?

That was the set of x values.

If you solve the equation for y, you should get $y = \frac{5-x}{2}$

Return to page $\frac{8}{2}$ and try question 17 again.

Wrong answer.

The only way the x term can be separated from the y term is by a subtraction.

Return to page $\frac{36}{1}$ and try question 15 again.

The abscissa, or x value, is a distance measured parallel to the X axis. Therefore, it cannot be vertical.

Return to page $\frac{55}{2}$ and try question 2 again.

$\frac{32}{1}$

Wrong answer.

This choice represents the statement:

"Twice the quantity m decreased by w ."

Return to page $\frac{21}{1}$ and try question 9 again.

$\frac{32}{2}$

Solving for y , gives the result y = x - 1 . Substituting in this equation should give you the correct values for y .

Return to page $\frac{52}{1}$ and try question 18 again.

Wrong answer.

In order to transform $2x + y = 12$ into the form $y = \cdots$, it is necessary to subtract $2x$ from both sides. You should then get the equation $y = 12 - 2x$.

Return to page $\frac{17}{2}$ and try question 16 again.

Since the X axis is horizontal, 3 units from the X axis means 3 units up or down. But the abscissa is the distance right or left from the origin.

Return to page $\frac{35}{2}$ and try question 1 again.

34
1

This is the best definition for "h". Since the problem mentions 5 inches, it is best to let h represent the number of inches in John's height.

Go on to question 2 below.

34
2

Question 2

Consider problem A again: "John's father is 5 inches shorter than twice John's height." Which is the best way to define the variable "f" ?

(A) f represents the father

(B) f represents the father's height

(C) f represents the number of inches in the father's height

(D) f represents the number of feet in the father's height

In looking for solutions, consider the following: If x is a positive integer, its smallest possible value is 1: but since 2x plus something is 9 , it follows that 2x is smaller than 9. Therefore, the largest value that x can have is 4. The possible values of x are 1 , 2 , 3 , 4. Substituting each value and solving for the value of y, we find that x = 3 , y = 1 is the only solution. Therefore, this is the correct choice.

You have now finished this Segment. Hand in the PUNCH CARD.

You should have entered in your NOTEBOOK the following definitions and formulas:

An ordered pair of numbers is when one number is taken from one set and " paired" with a number from a second set.

Example: Let A = (1 , 2 , 3) , B = (3 , 4 , 5).

Then, (3 , 4) is an ordered pair, where 3 is from A and 4 is from B.

You should now be able to complete the following problems from your HOMEWORK ASSIGNMENT: Questions 1-4

VOLUME 13 Segment 2 begins here:

Obtain a PUNCH CARD from your instructor. In addition to the other identifying information that must be furnished by you, you are asked to punch out the following:

COLUMNS	48	and	50	1 7	(Sequence Number)
	54	and	56	0 4	(Type of Punch Card)
	60	and	62	1 3	(Volume Number)
	66	and	68	0 2	(Segment Number)

Your READING ASSIGNMENT for this Segment is pg: 337 - 339.
You will now be asked a series of questions to draw your attention to the more important points.

In your reading you met the words " abscissa " , " ordinate " , " origin " , " quadrant " and other special words relating to graphs. We will now review the meanings of these words through a series of questions.

Question 1

If the abscissa of a point is 3 and its ordinate is 1 , which of the following completions do you recognize as being correct? The point is:

(A) 3 units up from the origin and 1 unit to the left.

(B) in quadrant I , 3 units from the x axis and 1 unit from the Y axis.

(C) in quadrant I , 3 units from the Y axis and 1 unit from the X axis.

(D) in quadrant II, 3 units from the Y axis and 1 unit from the X axis.

$\frac{36}{1}$

This choice is correct.

Now proceed to question 15 which follows:

Question 15

Apply the principles of solving equations to transform the equation $2x + 3y = 12$ into equation solved for "y".

(A) $y = \frac{2}{3} x + 4$

(B) $y = 4 - 2x$

(C) $y = 4 - \frac{2}{3} x$

(D) $y = \frac{2}{x}$

$\frac{36}{2}$

Any point on the Y axis is neither to the right or left of the origin. Therefore, its abscissa could not be negative.

Return to page $\frac{22}{2}$ and try question 3 again.

Each variable must represent a quality whose value is <u>not</u> known. You do know the value of a quarter or of a dime.

Return to page $\frac{26}{2}$ and try question 4 again.

If you locate these three points on a sheet of graph paper, then all you need do is put a straight edge next to the points to discover that they do <u>not</u> lie on a straight line.

Return to page $\frac{50}{2}$ and try question 6 again.

$\frac{38}{1}$

Every point on the Y axis has an x value of 0 . Therefore, this point P is not on the Y axis.

Return to page $\frac{51}{1}$ and try question 5 again.

$\frac{38}{2}$

Wrong answer.

It is true that it is necessary to perform a subtraction, but the same quantity must be subtracted from both sides of the equation. What should you subtract from the left side of the equation so that y remains alone ?

Return to page $\frac{30}{1}$ and try question 13 again.

This choice is correct.

Now proceed to question 6 which follows:

Question 6

If p represents the number of dimes, state how to represent the value, in cents, of all the dimes.

(A) 10 + p

(B) .10 + p

(C) 10 p

(D) .10 p

A look at the graph on which you have located these points will convince you that P is not above Q .

If you did not make a graph this ought to convince you that it is a good idea.

Return to page 58/2 and try question 4 again.

$\frac{40}{1}$

A look at the graph on which you have located these points will convince you that P is <u>not</u> below Q .

If you did not make a graph, this ought to convince you that it is a good idea.

Return to page $\frac{58}{2}$ and try question 4 again.

$\frac{40}{2}$

If the abscissa of a point is 2 , that means that the point is 2 units to the right from the origin. The abscissa gives us no information on whether the point is above or below the origin.

Return to page $\frac{60}{1}$ and try question 9 again.

Wrong answer.

If you solve the equation for "y", you should get $y = \frac{5-x}{2}$

Return to page 8/2 and try question 17 again.

Any point with a negative ordinate is down from the origin, and therefore is <u>not</u> on the X axis.

Return to page 73/1 and try question 10 again.

$\frac{42}{1}$

The ordinate, or y value is a distance measured parallel to the Y axis. Therefore, it cannot be horizontal.

Return to page $\frac{55}{2}$ and try question 2 again.

$\frac{42}{2}$

According to the graph for this choice, the line does not pass through any point in quadrant I . However, all the points listed in the problem lie in quadrant I .

If you locate the three given points on graph paper and draw the line connecting them, there would be no doubt that this choice is not correct.

Return to page $\frac{68}{2}$ and try question 15 again.

$\frac{43}{1}$

Wrong answer.

Did you reverse the order of the numbers in each pair ? The first number must represent x , the second, y . Solving the equation for y gives the form $y = x - 1$.

Return to page $\frac{52}{1}$ and try question 18 again.

$\frac{43}{2}$

The point (3, -1) is located 3 units to the right from the origin, and 1 unit down.

Return to page $\frac{67}{2}$ and try question 12 again.

$\frac{44}{1}$

If the abscissa is 3 , the point must be to the right of the origin.

It therefore cannot be in quadrant II .

Return to page $\frac{35}{2}$ and try question 1 again.

$\frac{44}{2}$

This choice is correct.

Now proceed to question 19 which follows:

Question 19

If $2x + 3y = 19$, and x and y are positive integers, apply the principles of solving equations to find the set containing all the ordered pairs which are solution sets of the equation.

(A) $\{(8,1),(5,3)\}$

(B) $\{(8,1)\}$

(C) $\{(8,1),(5,3),(2,5)\}$

(D) $\{(8,1),(2,5)\}$

Since point A is 2 units to the left, its x value is -2.

Return to page 59/2 and try question 7 again.

Any point with a positive abscissa is to the right of the origin, and is therefore <u>not</u> on the Y axis.

Return to page 63/1 and try question 11 again.

$\frac{46}{1}$

If the abscissa of a point is 5 , that means that the point is 5 units to the right of the origin.

Return to page $\frac{78}{1}$ and try question 8 again.

$\frac{46}{2}$

If you decide to solve the equation for y , you should get $y = 7 - x$. What did you get ?

Return to page $\frac{69}{2}$ and try question 14 again.

$\frac{47}{1}$

Any point in quadrant IV is to the right of the origin, and its abscissa is positive.

Return to page $\frac{22}{2}$ and try question 3 again.

$\frac{47}{2}$

Try locating some points which fit the equation $x = 5$. For example, (5,1) (5, -3) (5,0) (5,5) etc. When you draw the line through these points, examine it.

Return to page $\frac{64}{2}$ and try question 16 again.

$\frac{48}{1}$

If you locate these three points on a sheet of graph paper, then you can see that they do <u>not</u> lie on a straight line.

Return to page $\frac{50}{2}$ and try question 6 again.

$\frac{48}{2}$

Try locating some points which fit the equation $x = -2$, such as $(-2, 0)$, $(-2, 3)$ $(-2, -2)$, etc. You will discover that they do not lie on a line like the one pictured in this choice.

Return to page $\frac{66}{1}$ and try question 17 again.

Although R and S do not lie on a horizontal line, it is still correct to say that one point is to the right of the other, and to say that one point is above the other. Of course, your graph shows plainly that S is not to the right of R .

Return to page 51/1 and try question 5 again.

After you locate points T and W on your graph paper, draw the horizontal line through T and the vertical line through W .
What are the coordinates of the point where they meet ?
It is not a good idea to do a problem like this without making a careful graph.

Return to page 76/1 and try question 13 again.

50
1

Since point S has the x value 0 , it is located on the Y axis. Locating the point on graph paper is a good idea.

Proceed to question 6 , below.

50
2

Question 6

Apply your knowledge of coordinates to locate the following points on graph paper. Which set of 3 points all lie on a straight line ?

(A) (1 , 1) , (2 , 3) , (3 , 7)

(B) (1 , 1) , (2 , 3) , (-3 , 5)

(C) (1 , 1) , (2 , -1),, (-3 , 0)

(D) (1 , 1) , (3 , 1) , (-7 , 1)

This choice is correct.

Now proceed to question 5 which follows:

Point R has coordinates (2,0). Point S has coordinates (0, -4).

Which of the following do you recognize as being correct ?

(A) R is on the Y axis

(B) S is to the right of R

(C) S is on the Y axis

(D) R is below S

If the abscissa of a point is -2, that means that the point is 2 units to the left from the origin. The abscissa gives us no information on whether the point is above or below the origin.

Return to page 60/1 and try question 9 again.

$\frac{52}{1}$

This choice is correct.

Now proceed to question 18 which follows:

If $x \in \{0,1\}$ and $x - y = 1$, apply the principles of solving equations to find the ordered pairs which are solution sets of the equation.

(A) $\{(0, -1), (1, 2)\}$

(B) $\{(0, -1), (1, 0)\}$

(C) $\{(-1, 0), (2, 1)\}$

(D) $\{(0, 1), (1, 0)\}$

$\frac{52}{2}$

Any point with a negative ordinate is down from the origin.

Return to page $\frac{73}{1}$ and try question 10 again.

Since any point with abscissa 0 is on the Y axis, and any point with ordinate 0 is on the X axis, where would you find the point whose coordinates are (0 , 0) ?

Return to page 55/2 and try question 2 again.

If you locate the three points on graph paper, and draw the line passing through them you will see that it does not cross the Y axis below the origin. This is one obvious error in this choice.

Return to page 68/2 and try question 15 again.

$\frac{54}{1}$

The point (1,-3) is located 1 unit to the right from the origin, and 3 units down.

Return to page $\frac{67}{2}$ and try question 12 again.

$\frac{54}{2}$

Try locating some points which fit the equation $x = 5$

For example,

(5 , 1) , (5 , -3) , (5 , 5) , etc.

If you examine these points, you will discover that they all lie on a straight line.

Return to page $\frac{64}{2}$ and try question 16 again.

Since the Y axis is vertical, 3 units from the Y axis means 3 units to the right or left. If the point is to be in quadrant I, it must be to the right.

Since the X axis is horizontal, 1 unit from the X axis means 1 unit up or down. If the point is in quadrant I, it must be 1 unit up. Therefore this choice is correct.

Proceed to question 2, below.

Question 2

Which statement do you recognize as being correct ?

(A) the abscissa is a vertical distance

(B) the ordinate is a horizontal distance

(C) there is no point with coordinates (0 , 0)

(D) the X axis and the Y axis intersect at the origin

$\frac{56}{1}$

Since point C is 2 units to the right, its x value is 2.

Return to page $\frac{59}{2}$ and try question 7 again.

$\frac{56}{2}$

Any point with a positive abscissa is to the <u>right</u> from the origin.

Return to page $\frac{63}{1}$ and try question 11 again.

If the ordinate of a point is 5, that means that the point is 5 units up from the origin. The ordinate gives us no information on whether the point is to the right or to the left.

Return to page $\frac{78}{1}$ and try question 8 again.

The problem stated that the replacement set for x is $\{-1, 0, 1\}$. Did you use these as y values ?

Return to page $\frac{69}{2}$ and try question 14 again.

58
1

Any point on the X axis is neither up nor down from the origin. Therefore its ordinate could not be positive or negative, but the point could be to the left of the origin, in which case its abscissa would be negative. Of all the choices listed, this is the only place where the point might be located.

Proceed to question 4 below.

58
2

Question 4

Point P has coordinates (-5 , 3) . Point Q has coordinates (4 , 3). Which of the following do you recognize as correct ?

(A) P is to the left of Q

(B) P is to the right of Q

(C) P is above Q

(D) P is below Q

If you locate these three points on graph paper, then you can see that they all lie on a line parallel to the X axis. Could you have told that from the coordinates without making a graph?

Proceed to question 7 below.

Question 7

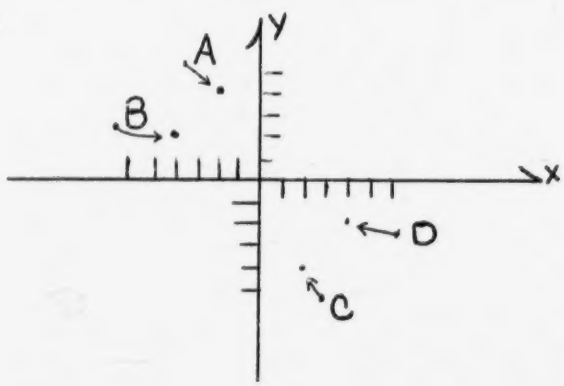
Apply the principles of graphing to find which point in the diagram has the coordinates (-4 , 2) .

(A) A

(B) B

(C) C

(D) D



60/1

This choice is correct.

Now proceed to question 9 which follows:

If a point is 2 units above the X axis, which statement do you recognize as correct ?

(A) its abscissa is 2

(B) its abscissa is -2

(C) its ordinate is 2

(D) its ordinate is -2

60/2

This graph shows a single point whose x value is -2. However, the equation given means that any point with x value -2 fits the equation, regardless of its y value. Therefore this choice is incorrect.

Return to page 66/1 and try question 17 again.

Although R and S do not lie on a vertical line, it is still correct to say that one point is above the other, and to say that one point is to the right of the other.

Of course your graph shows plainly the R is <u>not</u> below S.

Return to page 51/1 and try question 5 again.

Your choice says that the value of delta y is 2 , but this is not correct. Is that what you meant?

Return to page 83/1 and try question 3 again.

$\frac{62}{1}$

If the ordinate of a point is -2 , that means that the point is 2 units down from the origin.

Return to page $\frac{60}{1}$ and try question 9 again.

$\frac{62}{2}$

If you solve the equation for x , you should get $x = \frac{1}{2}(6 + 3y)$. What did you get ? Try substituting the coordinates, listed in this choice. In the equation $2x - 3y = 6$, you will discover that they do not check.

Return to page $\frac{77}{2}$ and try question 19 again.

This choice is correct.

Now proceed to question 11 which follows:

If a point has an abscissa which is positive and a zero ordinate, which one of the following answers do you recognize as correct.

(A) the point is on the Y axis below the origin.

(B) the point is on the X axis to the left of the origin.

(C) the point is on the Y axis above the origin.

(D) the point is on the X axis to the right of the origin.

Your choice says that the value of delta y is 4 , but that is not correct. Is that what you meant ?

Return to page 70/1 and try question 1 again.

64
1

If you locate the three points on graph paper, and draw the line passing through them, you will see that it has the same appearance as this choice. Although the graph does not show any scale of value, the other choices give a completely different appearance. Therefore, this choice is correct.

Proceed to question 16 below.

64
2

Question 16

Which of the following statements do you recognize to be true of the graph of the equation $x = 5$?

(A) it is a line parallel to the X axis.

(B) it is a line parallel to the Y axis.

(C) it is a line, but not parallel to either axis.

(D) it is not a straight line.

The point (-1,3) is located 1 unit to the left from the origin, and 3 units up. Point P is close to that location, but not at that location.

Return to page 67/2 and try question 12 again.

The graph of the line y = 2 contains many points. One of them has an x value of -2 , another has an x value of zero, and you can find one with any x value you desire. But the question asked for the statement that is true for every point on the graph.

Return to page 82/1 and try question 18 again.

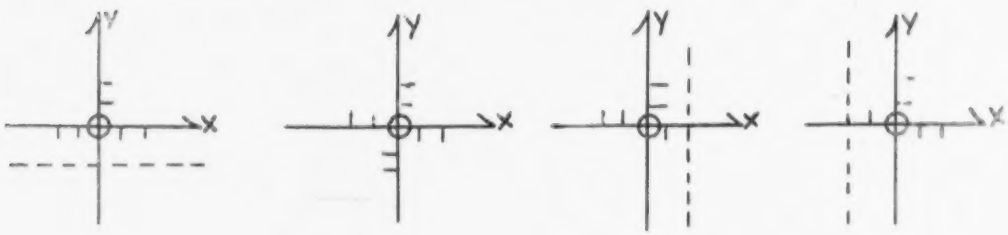
66/1

This choice is correct.

Now proceed to question 17 which follows:

Of the four graphs below, choose the graph of the equation $x = 2$

(A) (B) (C) (D)



66/2

If you subtract the coordinates of point S from those of point Q, you will find that both delta x and delta y are positive. If you should subtract in reverse order, both values would be negative. In either case, since the slope is the ratio of the two quantities which have the same sign, it is a positive number.

Return to page 87/2 and try question 4 again.

Since point D is 4 units to the right, its x value is +4

Return to page 59/2 and try question 7 again.

This choice is correct.

Now proceed to question 12 which follows:

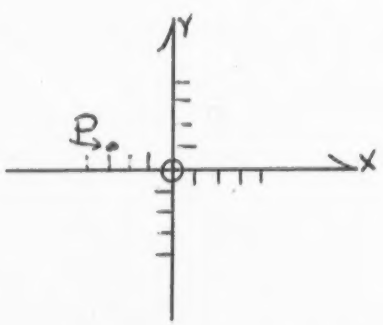
What do you recognize as the coordinates of point P ?

(A) (-3 , 1)

(B) (3 , -1)

(C) (1 , -3)

(D) (-1 , 3)



$\frac{68}{1}$

If the ordinate of a point is -5 , that means that the point is 5 units down from the origin. The ordinate gives us no information on whether the point is to the right or to the left.

Return to page $\frac{78}{1}$ and try question 8 again.

$\frac{68}{2}$

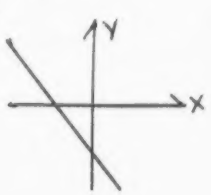
This choice is correct.

Now proceed to <u>question 15</u> which follows:

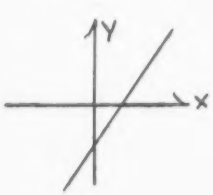
The three points (1 , 3) , (3 , 2) , (5 , 1) lie on a straight line. Apply the principles of graphing to find the correct graph of the line joining these points.

(A)

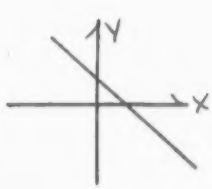
(B)



(C)



(D)



After you locate points T and W on graph paper, you will discover that the horizontal line through T goes through all the points whose ordinates are -1. The vertical line through W goes through all the points whose abscissas are 1. Therefore, the two lines meet at (1,-1).

Proceed to question 14 below.

Question 14

For the equation $x + y = 7$, when $x \in \{ -1, 0, 1 \}$, choose a convenient procedure and calculate the roots of this equation.

They are:

(A) (-1 , -8) , (0 , -7) , (1 , -6)

(B) (-1 , 6) , (0 , 7) , (1 , 8)

(C) (8 , -1) , (7 , 0) , (6 , 1)

(D) (-1 , 8) , (0 , 7) , (1 , 6)

70
1

Volume 13 Segment 3 begins here:

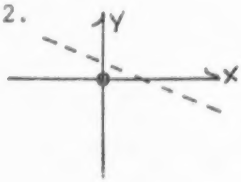
Obtain a PUNCH CARD from your instructor. In addition to the other identifying information that must be furnished by you you are asked to punch out the following:

COLUMNS	48	and	50	1 8	(Sequence Number)
	54	and	56	0 4	(Type of Punch Card)
	60	and	62	1 3	(Volume Number)
	66	and	68	0 3	(Segment Number)

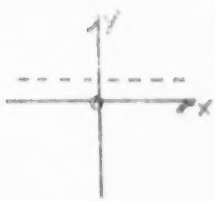
As you move from one point to another, the vertical change, or difference in ordinates, is called delta y. The symbol $\triangle$ is read delta. In the same way, the horizontal change or difference in abscissas is called delta x.
The slope of a straight line can therefore be defined as y/x. You will discover that the slope of a line is the same regardless of which two points you use in the calculation.
The slope is a fraction and must never be written as a mixed number. If y = 5 and x = 3, the slope is 5/3. Of course, if the slope is 6/3 = 2/1, it can be written as 2. A negative slope, such as -(5/6) can be written either as -5/6 or as 5/-6.
You ought to list in your notebook the following diagrams and facts:

1.

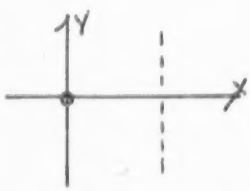
rising line: slope is a positive number

2. 

falling line: slope is a negative number

3. 

horizontal line: slope is zero

4. 

vertical line: NO SLOPE (observe the difference between zero slope and no slope)

5. slope = $\frac{\triangle y}{\triangle x}$ = $\frac{\text{difference in y values}}{\text{difference in x values}}$

Your READING ASSIGNMENT for this Segment is pg: 343 - 348
You will now be asked a series of questions to draw your attention to the more important points.

70
2

Question 1

Draw the straight line through P (-1 , 1) and Q (5 , 4). You will find that the line passes through R (3 , 3) and S (1 , 2). For the points P and Q , perform the calculations and find the values of $\triangle$ y and $\triangle$ x in that order.

(A) 4 , 3 (B) 3 , 4 (C) 6 , 3 (D) 3 , 6

Try locating some points which fit the equation $x = -2$, such as $(-2, 0)$, $(-2, -2)$, $(-2, 3)$, etc. You will discover that they do lie on a line, but not the one pictured in this choice.

Return to page 66/1 and try question 17 again.

In order for the two segments to lie on one line, it is necessary for them to have equal slopes.

Return to page 116/1 and try question 10 again.

72/1

If you use the values of delta y and delta x which you found to be correct in question 1, and the correct definition of slope, you would not get this value.

Return to page 86/2 and try question 2 again.

72/2

If you subtract the coordinates of point R from those of point S, you will find that delta y is -1. However, you will not get the value listed here for delta x.

Return to page 83/1 and try question 3 again.

This choice is correct.

Now proceed to question 10 which follows:

If a point has an abscissa of zero and a negative ordinate, which do you recognize as correct?

(A) the point is on the Y axis below the origin.

(B) the point is on the X axis to the left of the origin.

(C) the point is on the Y axis above the origin.

(D) the point is on the X axis to the right of the origin.

The values given were for y. Did you use them as x values by mistake?

Return to page $\frac{77}{2}$ and try question 19 again.

$\frac{74}{1}$

Your choice says that delta x is 4. The difference in x values must be found by subtracting. Did you use the rules for subtraction of signed numbers ?

Return to page $\frac{70}{2}$ and try question 1 again.

$\frac{74}{2}$

Since this line is not parallel to the X axis, its slope is not zero.

Return to page $\frac{80}{1}$ and try question 5 again.

If you substitute $x = 0$ in the equation, you find that $y = -5$. Therefore, the graph must cross the Y axis 5 units below the origin. Your choice is therefore incorrect.

Return to page $\frac{84}{1}$ and try question 20 again.

Since this line is not rising as it moves to the right, its slope is not positive.

Return to page $\frac{106}{1}$ and try question 6 again.

76/1

This choice is correct.

Now proceed to question 13 which follows:

Question 13

If point T is (5, -1) and point W is (1, 4), determine the coordinates of a point on the same horizontal line as T and the same vertical line as W.

(A) (1, -1) (B) (5, 4)

(C) (-1, 1) (D) (4, 5)

76/2

If you subtracted the coordinates of point F from those of point E ; you should have found that both delta x and delta y were positive. If you subtracted in reverse order, both were negative. In any case, the value of the slope would be positive.

Return to page 81/1 and try question 8 again.

The points (-2, -2), (0 -2), and an infinite number of other points lie on the line y = -2. Since all the points have different values, it is proper to say that for every point on the line the x value cannot be determined. Of course, for any particular point, the x value can be determined. This question shows the importance of reading the question carefully.

Proceed to question 19 below.

Question 19

For the equation $2x - 3y = 6$, when $y \in \{-4, 2, 4\}$, choose a convenient procedure and calculate the roots of the equation. They are:

(A) (-3, -4), (6, 2), (9, 4)

(B) (9, -4), (0, 2), (-3, 4)

(C) (-9, -4), (0, 2), (3, 4)

(D) $(-4, \frac{-14}{3})$, $(2, \frac{-2}{3})$, $(4, \frac{2}{3})$

$\frac{78}{1}$

This choice is correct.

Now proceed to question 8 which follows:

If a point is 5 units to the left of the Y axis, which statement do you recognize as correct?

(A) its abscissa is 5

(B) its abscissa is -5

(C) its ordinate is 5

(D) its ordinate is -5

$\frac{78}{2}$

Did you use the definition that slope is $\frac{\Delta y}{\Delta x}$? If you did, then there is some mistake in calculation, since this is not the value of the slope.

Return to page $\frac{87}{2}$ and try question 4 again.

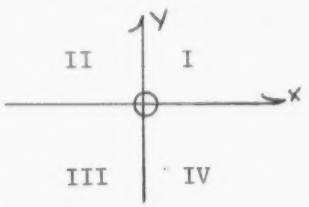
If you set up a table of values, by taking 3 values for x, and then calculate the values for y, you will have the coordinates of three points on the line. Plotting the points and drawing the line should give you a line which crosses the X-axis to the right of the origin and the Y-axis below the origin. Even though the graph doesn't show a scale of values, this is the only one which crosses the axes at the proper places.

You have now completed this segment. Make sure the following items are in your notebook.

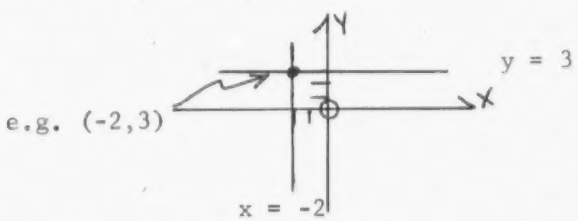
1. The abscissa is the value of x while the ordinate is the value of y.

2. The point of intersection of the x and y axes is called the origin with coordinates (0 , 0).

3. The axes of the coordinate system divide the plane into four quadrants.



4. To locate the graph of the ordered pair (a , b) draw the vertical line x = a and the horizontal line y = b and their point of intersection is the point (a , b).



Hand in your punch card. You should now do questions 5-8 of the homework assignment.

Segment 3 is optional. You may skip it and proceed with segment 4, if you wish. However, in segment 3, we learn about a very useful topic in graphs, one which will permit you to draw graphs and understand graphs more quickly and easily.

If you have done very well with segments 1 and 2, it is advisable for you to go on to segment 3. However, if you found the work difficult, it would be better to go to segment 4.

The test will not call for any material from segment 3. In any case don't forget to do the homework assignment first.

You will find question 1 of segment 3 on page $\frac{70}{1}$

You will find question 1 of segment 4 on page $\frac{100}{1}$

80
1

This choice is co. ect.

Now proceed to question 5 which follows:

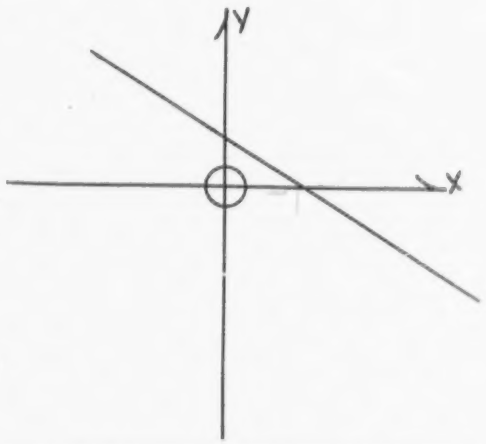
Which do you recognize as true of the slope of the line shown in the graph?

(A) positive

(B) negative

(C) zero

(D) none



80
2

The slope of a line has nothing to do with its length. This choice means that the two line segments have the same length. Therefore this choice is incorrect.

Return to page 102/1 and try question 11 again.

This choice is correct.

Now proceed to question 8 below.

Question 8

Perform the calculations to find the slope of EF

Given: the coordinates of E are: (1,3)

the coordinates of F are: (0,1)

(A) -2

(B) 2

(C) $-\frac{1}{2}$

(D) $\frac{1}{2}$

If you apply the definition of slope to the values given, you get the slope equals $\frac{3}{x+1}$. Since you were told that the slope is 3 , this gives you the equation $\frac{3}{x+1} = 3$.

It is obvious that your choice does not satisfy this equation.

Return to page 95/2 and try question 14 again.

82/1

This choice is correct.

Now proceed to question 18 which follows:

If the equation $y = -2$ is graphed, apply your knowledge of coordinates to decide which of the following is true of every point on the graph.

(A) its x value is -2

(B) its x value is not determined

(C) its x value is zero

(D) its x value is a fixed number, but not zero or -2

82/2

This choice means that the lengths of the two segments are equal. Is that what you meant to say ?

The slope of a line segment has nothing to do with its length.

Return to page 116/1 and try question 10 again.

This choice is correct.

Now proceed to question 3 which follows:

Draw the straight line through P (-1, 1) and Q (5, 4). You will find that the line passes through R (3, 3) and S (1, 2).

For the points R and S, perform the calculations to find the values of Δy and Δx in that order.

(A) 2, 1

(B) -1, 2

(C) -1, -2

(D) 1, -2

Applying the definition of slope and the values you were given, results in the equation $-\frac{1}{2w} = \frac{2}{3}$. Your choice is not the correct solution to this equation.

Return to page $\frac{107}{2}$ and try question 15 again.

$\frac{84}{1}$

This choice is correct.

Now proceed to question 20 which follows:

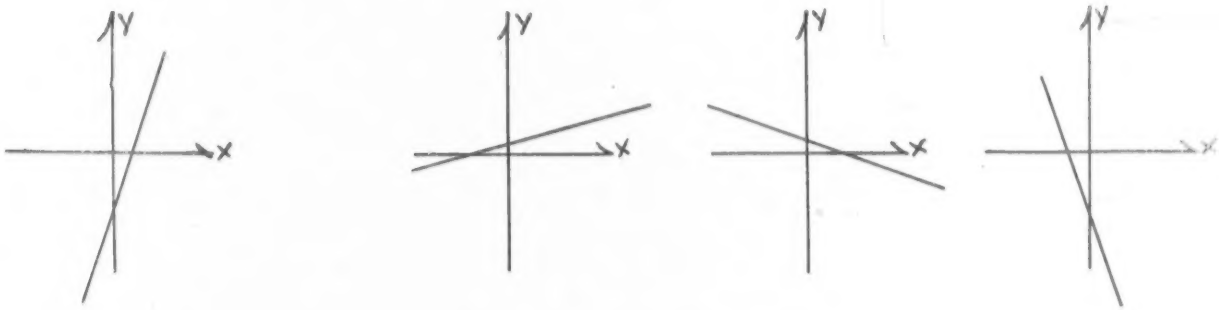
Question 20

Apply the principles of graphing to draw the graph of the equation

$$3x - y = 5$$

Which of the following graphs is correct ?

(A) (B) (C) (D)



$\frac{84}{2}$

Applying the definition of slope and the values you were given, results in the equation $-\frac{4p}{10} = -\frac{4}{5}$. Your choice is not the correct solution to this equation.

Return to page $\frac{96}{2}$ and try question 16 again.

85/1

Your choice says that delta x is 3 , but this is not correct. Is that what you meant ?

Return to page 70/2 and try question 1 again.

85/2

Since this line is not parallel to the Y axis, it does have a slope.

Return to page 80/1 and try question 5 again.

$\frac{86}{1}$

If you substitute $y = 0$ in the equation, you find that $x = \frac{5}{3}$, that is, it is positive. Therefore the graph must cross the X axis to the right of the origin. Your choice is incorrect.

Return to page $\frac{84}{1}$ and try question 20 again.

$\frac{86}{2}$

This choice is correct.

Now proceed to question 2 which follows:

Draw the straight line through P (-1,1) and Q (5,4). You will find that the line passes through R (3,3) and S (1,2).

Perform the calculations to find the slope of PQ.

(A) $\frac{4}{3}$

(B) $\frac{3}{4}$

(C) $\frac{1}{2}$

(D) 2

If you subtract the coordinates of point R from those of point S, you will find that delta y is -1 and that delta x is -2. If you subtracted in reverse order the value of delta y would be 1, and delta x would be 2.

Since this choice gives the only combination of values which are both correct, this is the correct answer.

Proceed to question 4 below.

Question 4

Draw the straight line through P (-1, 1) and Q (5, 4). You will find that the line passes through R (3, 3) and S (1, 2).

Perform the calculations to find the slope of SQ.

(A) $\frac{1}{2}$

(B) $-\frac{1}{2}$

(C) 2

(D) -2

$\frac{88}{1}$

Since this line is not falling as it moves to the right, its slope is not negative.

Return to page $\frac{106}{1}$ and try question 6 again.

$\frac{88}{2}$

The definition of slope is $\frac{\Delta y}{\Delta x}$. If you got the value $\frac{1}{2}$ using this definition, then you made some mistake in calculation.

Return to page $\frac{81}{1}$ and try question 8 again.

This choice is correct.

Now proceed to question 9 which follows:

Consider points E (1, 3), F (0, 1) and G (-4, -6). Perform the calculations to find the slope of FG.

(A) $\frac{7}{4}$

(B) $\frac{5}{4}$

(C) $-\frac{7}{4}$

(D) $-\frac{5}{4}$

This choice says that the lines have the same length. The length of a line has nothing to do with its slope, therefore, this choice is incorrect.

Return to page $\frac{114}{2}$ and try question 12 again.

$\frac{90}{1}$

Since this line joins the points (-4, 0) and (0, -3), the value of $\frac{\triangle y}{\triangle x}$ is not the value you have chosen.

Return to page $\frac{101}{1}$ and try question 7 again.

$\frac{90}{2}$

The transformation called for in this question involves subtraction and division. You have made a mistake in each of these.

Return to page $\frac{109}{2}$ and try question 17 again.

Since PQ and QR meet at point Q , they are not parallel.

Return to page 102/1 and try question 11 again.

In order to find the slope and the y intercept, it is necessary to put the equation in the form $y = mx + b$. The equation as given to you has a minus sign, which the standard form does not show. You must rewrite it so that it appears as $y = +(\ )x + (\ )$. The parentheses are to be filled with the proper signed numbers, so that the original equation is still equal to this.

Return to page 118/2 and try question 19 again.

$\frac{92}{1}$

Since this line is falling as it moves to the right, its slope is not positive.

Return to page $\frac{80}{1}$ and try question 5 again.

$\frac{92}{2}$

If the line passes through the origin, then the coordinates of the origin can be substituted in the equation. If you do this you will find that letting $a = 0$ does not make the equation true.

Return to page $\frac{124}{2}$ and try question 21 again.

Applying the definition of slope and the values you were given, results in the equation $-\frac{4p}{10} = -\frac{4}{5}$. Since this equation can be solved, your choice is incorrect.

Return to page $\frac{96}{2}$ and try question 16 again.

Since FF and FG meet at point F, they cannot be parallel.

Return to page $\frac{11(}{1}$ and try question 10 again.

$\frac{94}{1}$

In order to calculate Δ y, it is necessary to subtract one y value from the other. Did you forget to use the rule for subtraction of signed numbers?

Return to page $\frac{89}{1}$ and try question 9 again.

$\frac{94}{2}$

If you attempt to put this equation in the form $y = mx + b$, you get the result $y = 7$. The slope can be found when the equation is in this form by finding the coefficient of x. What is the coefficient of x ?

Return to page $\frac{123}{1}$ and try question 18 again.

Since the slope of HJ is 2 , and the slope of JK is also 2 , it follows that H, J and K lie on one line.

Proceed to Question 14 below.

Question 14

The slope of PQ is 3. If P is (-1, -3) and Q is (x, 0), apply your knowledge of slope to find the value of x.

(A) 2

(B) -1

(C) 0

(D) -2

$\frac{96}{1}$

Applying the definition of slope and the values you were given results in the equation $-\frac{1}{2w} = \frac{2}{3}$. Solving this equation gives the value $w = -\frac{3}{4}$

Proceed to Question 16 below

$\frac{96}{2}$

Question 16

If a line with slope $-\frac{4}{5}$ passes through the points with coordinates (m, 2p) and (m + 10, -2p) apply your knowledge to find the value of p.

(A) -2

(B) 2

(C) 0

(D) cannot be found

Since ST and TU meet at point T, they cannot be parallel.

Return to page 114/2 and try question 12 again.

You are correct in stating that the line crosses the Y axis at this point. However this is NOT the y intercept.

It might be a good idea to check your textbook again for the definition of y intercept.

Return to page 103/1 and try question 20 again.

98/1

If you subtract the coordinates of point S from those of point R, you will find that delta y is 1. However, you will not get the value listed here for delta x.

Return to page 83/1 and try question 3 again.

98/2

To proceed from (0, 1) to (-3, -1) would mean that delta y is -2 and delta x is -3. This disagrees with the fact that the slope is $-\frac{2}{3}$.

Return to page 111/2 and try question 22 again.

Since this line is not parallel to the X axis, its slope is not zero.

Return to page 106/1 and try question 6 again.

Since the y intercept shown on this graph is -1, this choice is incorrect.

Return to page 125/2 and try question 23 again.

100
1

Volume 13 Segment 4 begins here:

Obtain a PUNCH CARD from your instructor. In addition to the other identifying information that must be furnished by you you are asked to punch out the following:

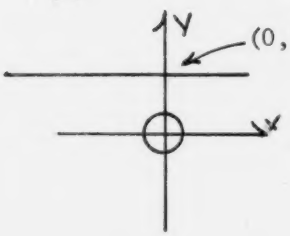
COLUMNS	48	and	50	1 9	(Sequence Number)
	54	and	56	0 4	(Type of Punch Card)
	60	and	62	1 3	(Volume Number)
	66	and	68	0 4	(Segment Number)

Your READING ASSIGNMENT for this Segment is pg: 350 - 353
You will now be asked a series of questions to draw your attention to the more important points.

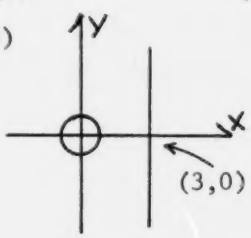
Question 1

Which of the following do you recognize as the graph of $x = 3$?

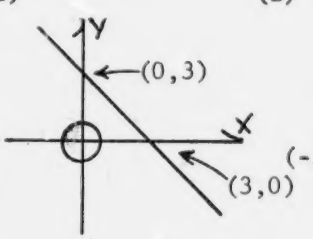
(A)



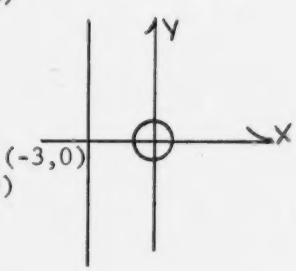
(B)



(C)



(D)



100
2

This graph crosses the Y axis at a point whose x value is 0. Therefore it is not the graph of $x = 4$

Return to page 132/1 and try question 2 again.

This choice is correct.

Now proceed to question 7 which follows:

Question 7

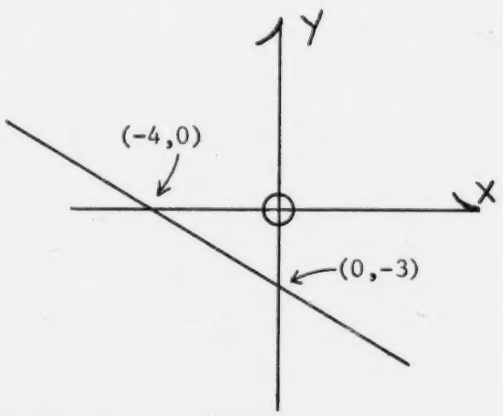
Perform the calculations to find the slope of the line shown in the graph.

(A) $-\frac{4}{3}$

(B) $\frac{3}{4}$

(C) $-\frac{4}{3}$

(D) $\frac{3}{4}$



In transforming the equation, you performed a division. However, you have made a mistake in the division.

Return to page 109/2 and try question 17 again.

102
1

This choice is correct.

Now proceed to question 11 which follows:

For the points P (1, 1) Q (5, -1) and R (7, -2) apply your knowledge of slope to decide which is correct.

(A) PQ and QR are equal

(B) PQ and QR lie on one line

(C) PQ and QR are parallel

(D) PQ and QR do not lie on one line

102
2

To proceed from (0, 1) to (3, 3) would mean that delta y is 2 and delta x is 3. This disagrees with the fact that slope is $-\frac{2}{3}$.

Return to page 111/2 and try question 22 again.

Since the slope of JK is 2, while the slope of KL is $\frac{9}{5}$ it follows that J, K and L do not lie on one line.

Return to page $\frac{112}{1}$ and try question 13 again.

This choice is correct.

Now proceed to question 20 which follows:

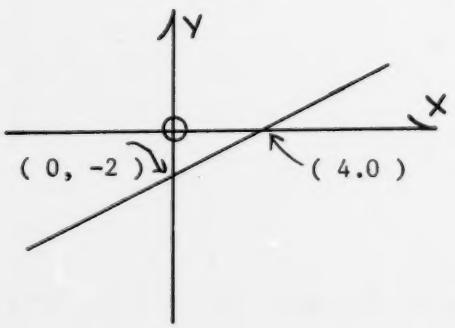
Which do you recognize as the Y intercept shown on the graph?

(A) (0, -2)

(B) (4, 0)

(C) -2

(D) 4



104
1

Since ST has no slope, it is parallel to the Y axis. Since TU has no slope, it is also parallel to the Y axis.

This choice is not correct.

Return to page 114 and try question 12 again.
2

104
2

If the line passes through the origin, then the coordinates of the origin can be substituted in the equation. If you do this, you will find that letting $b = 0$ does not make the equation true.

Return to page 124 and try question 21 again.
2

If you subtract the coordinates of point G from those of point F, you find that both delta y and delta x are positive. If you subtract in reverse order, both values are negative. In either case the slope turns out to be a positive number.

Return to page 89/1 and try question 9 again.

If you solve this equation for y , you will get these numbers, but not with the same signs.

Return to page 119/2 and try question 24 again.

106
1

This choice is correct.

Now proceed to question 6 which follows:

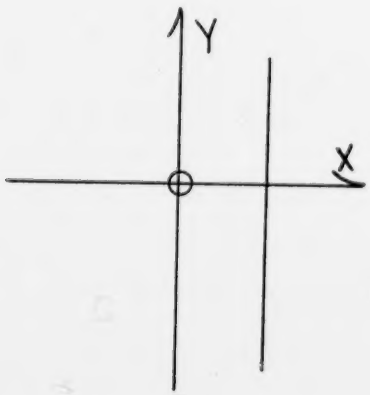
Which do you recognize as true of the slope of the line shown in the graph?

(A) positive

(B) negative

(C) zero

(D) none



106
2

Since the graph in this choice is rising, its slope is a positive number. Therefore, this choice is incorrect.

Return to page 125/2 and try question 23 again.

If you apply the definition of slope to the values given, you get the slope equals $\frac{3}{x+1}$. Since you were told that the slope is 3 , this gives you the equation $\frac{3}{x+1} = 3$.

Solving the equation gives the value $x = 0$. Therefore, this is the correct choice.

Proceed to question 15 below.

Question 15

If a line with slope $\frac{2}{3}$ passes through points whose coordinates are (w, 3) and (3w, 2), apply your knowledge of slope to find the value of w.

(A) $\frac{3}{4}$

(B) $\frac{4}{3}$

(C) $-\frac{4}{3}$

(D) $-\frac{3}{4}$

108
1

This point is the point where the graph crosses the X axis. It is not the Y intercept.

Return to page 103/1 and try question 20 again.

108
2

In order to solve this equation for y subtract x from both sides of the equation. This gives

$$-3y = -x + 5$$

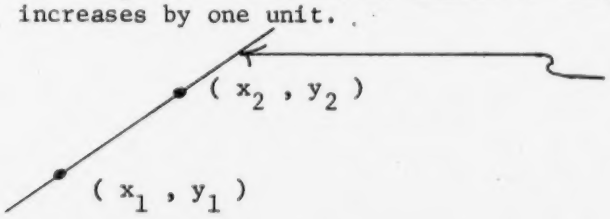
Next divide both sides of the equation by -3 and the result is:

$$y = \frac{1}{3}x - \frac{5}{3}$$

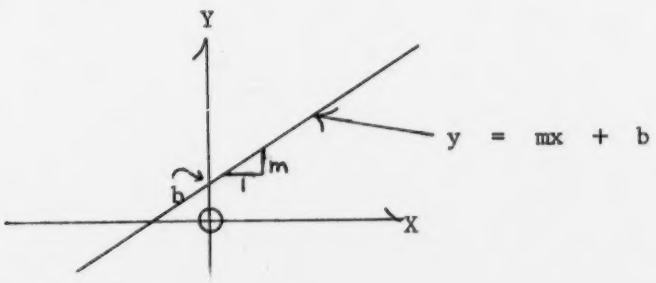
Therefore, this choice is correct.

You have completed this Segment. Hand in the PUNCH CARD.
You should have entered in your NOTEBOOK the following definitions and formulas:

(1) The slope of a line is the number of units y increases when x increases by one unit.

(2) 

(3) The Y intercept of an equation is that value of y when x = 0 and can be graphically seen as the point where the equation crosses the Y axis.

(4) 

Volume 13 Segment 4 begins on page 100/1

Applying the definition of slope and the values you were given, results in the equation $-\frac{4p}{10} = -\frac{4}{5}$.

Solving this equation gives the value $p = 2$.

Proceed to question 17 below.

Question 17

If you apply algebraic procedures to transform the equation $2x + 3y = 9$ into the form $y = mx + b$, the result is:

(A) $y = \frac{2}{3}x + 9$

(B) $y = -\frac{2}{3}x + 9$

(C) $y = \frac{2}{3}x - 3$

(D) $y = -\frac{2}{3}x + 3$

$\frac{110}{1}$

Since the slope of HJ is 2, while the slope of JL is $\frac{11}{6}$, it follows that H, J and L do not lie on one line.

Return to page $\frac{112}{1}$ and try question 13 again.

$\frac{110}{2}$

This graph crosses the Y axis at a point whose coordinates are $x = 0$, $y = 3$. Therefore, this is not the graph of $x = 3$.

Return to page $\frac{100}{1}$ and try question 1 again.

If the line passes through the origin, then the coordinates of the origin (0, 0) can be substituted in the equation. If you do this, you will find that the result is the equation $c = 0$. Therefore, this is the correct choice.

Proceed to question 22 below.

Question 22

A line with slope $-\frac{2}{3}$ passes through point P (0, 1). If you apply the meaning of slope, which is the next point after P which you would locate on your graph?

(A) (-3, -1)

(B) (3, 3)

(C) (-2, 4)

(D) (3, -1)

112
1

This choice is correct.

Now proceed to question 13 which follows:

Apply your knowledge of slope to determine which 3 of the following points lie on one line: H(4,8), J(1,2), K(0,0), L(-5,-9).

(A) H, J, K

(B) J, K, L

(C) H, J, L

(D) H, K, L

112
2

In transforming the equation, you had to perform a subtraction. However, you have made a mistake in doing it.

Return to page 109/2 and try question 17 again.

To proceed from (0, 1) to (-2, 4) would mean that delta y is 3 and delta x is -2. This disagrees with the fact that the slope is $-\frac{2}{3}$.

Return to page 111/2 and try question 22 again.

This graph crosses the Y axis at a point whose coordinates are

$$x = 0, \quad y = 4$$

Therefore, it is not the graph of $y = x$.

Return to page 132/1 and try question 2 again.

114
1

The correct value of the slope of PQ is $-\frac{1}{2}$; the correct value of the slope of QR is also $-\frac{1}{2}$. Therefore, lines PQ and QR do lie on one line. No matter how carefully you may make a graph, you cannot be sure from its appearance that two segments form one line.

Proceed to question 12 below.

114
2

Question 12

For the points S (-3, 5), T (-3, -3), and U (-3, 0), apply your knowledge of slope to decide which is correct.

(A) ST and TU are equal

(B) ST and TU lie on one line

(C) ST and TU are parallel

(D) ST and TU do not lie on one line

If the line passes through the origin, then the coordinates of the origin can be substituted in the equation. If you do this, you will find that letting $a = 0$ and $b = 0$ does not make the equation true.

Return to page 124/2 and try question 21 again.

The graph crosses the X axis at a point (2, 0), whose coordinates do not fit the equation $y = x + 2$.

Return to page 137/1 and try question 3 again.

116/1

This choice is correct.

Now proceed to question 10 which follows:

Using the results which you have found to be correct in questions 8 and 9,

i.e. the slope of EF = 2 and the slope of FG = $\frac{7}{4}$

apply your knowledge of slope to decide which is correct.

(A) EF and FG lie on one line

(B) EF and FG are equal

(C) EF and FG are parallel

(D) EF and FG do not lie on one line

116/2

In order to draw the graph of an inequality it is necessary that the graph of the equation be drawn first.

Return to page 144/2 and try question 5 again.

In solving for y , you have made a serious error. You should have performed a division to get ly = .

Return to page 119/1 and try question 24 again.

This choice is correct.

Now proceed to question 7 which follows:

Question 7

If the inequality $y > x - 5$ is graphed, apply your knowledge of inequalities to decide which point is above the line.

(A) (-1, -5)

(B) (0, -5)

(C) (1, -5)

(D) (2, -5)

118
1

When you put this equation in the form $y = mx + b$, you get the result $y = 7$. This can be written in the form $y = 0x + 7$. Therefore, the slope of this equation is 0.

Proceed to question 19 below.

118
2

Question 19

For the equation $y = \frac{3}{4}x - \frac{1}{4}$, the slope and y intercept are listed in that order. Which do you recognize as correct?

	Slope	y Intercept
(A)	$\frac{3}{4}$	$-\frac{1}{4}$
(B)	$\frac{3}{4}$	$\frac{1}{4}$
(C)	$-\frac{3}{4}$	$-\frac{1}{4}$
(D)	$-\frac{3}{4}$	$\frac{1}{4}$

This value is the abscissa of the point where the line crosses the X axis. It is not the y intercept.

Return to page $\frac{103}{1}$ and try question 20 again.

This choice is correct.

Now proceed to question 24 which follows:

Question 24

Apply the principles of this lesson to find the slope and y intercept, in that order, for the equation $x - 3y = 5$.

(A) $\frac{1}{3}$, $\frac{5}{3}$

(B) $-\frac{1}{3}$, $-\frac{5}{3}$

(C) $\frac{1}{3}$, $-\frac{5}{3}$

(D) 1 , -8

120
1

Volume 13 Segment 5 begins here:

Obtain a PUNCH CARD from your instructor. In addition to the other identifying information that must be furnished by you you are asked to punch out the following:

COLUMNS	48 and 50	2 0	(Sequence Number)
	54 and 56	0 4	(Type of Punch Card)
	60 and 62	1 3	(Volume Number)
	66 and 68	0 5	(Segment Number)

Your READING ASSIGNMENT for this Segment is pg: 367 - 370
You will now be asked a series of questions to draw your attention to the more important points.

Question 1

If the graphs of two equations meet at one point, which completion do you recognize makes the statement correct?

The equations are,

(A) inconsistent

(B) independent

(C) dependent

(D) equivalent

120
2

The point (-1 , 0) is on the line x = 3y - 1, not the left of it.

Return to page 145/1 and try question 8 again.

If you calculate the slope correctly, you will find that both slopes are equal to $-\frac{1}{2}$. If PQ and QR did not lie on the same line, their slopes would be unequal.

Return to page $\frac{102}{1}$ and try question 11 again.

This is the graph of the equation $x = -3$, since every point on the line has an x value of -3.

Return to page $\frac{100}{1}$ and try question 1 again.

$\frac{122}{1}$

Since the slope of HK is 2, while the slope of KL is $\frac{9}{5}$ it follows that H, K and L do not lie on one line.

Return to page $\frac{112}{1}$ and try question 13 again.

$\frac{122}{2}$

This choice consists of points which are on or above the line. Clearly P does not fit here.

Return to page $\frac{148}{1}$ and try question 10 again.

This choice is correct.

Now proceed to question 18 which follows:

Apply the principles of this lesson to find the slope of a line whose equation is $y - 5 = 2$.

(A) 2

(B) -5

(C) 7

(D) 0

The equation $x + 2y = 8$ can be transformed into the form $y = \frac{8-x}{2}$. If you wish to separate the terms, the 8 must be divided by 2, giving $y = 4 - \frac{x}{2}$

Return to page $\frac{141}{2}$ and try question 12 again.

$\frac{124}{1}$

The y intercept of a line is defined as the ordinate of the point where the line crosses the Y axis. This choice is, therefore, correct.

Proceed to question 21 below.

$\frac{124}{2}$

Question 21

If the graph of the equation $ax + by = c$ passes through the origin, apply the principles of this lesson to find which of the following must be true.

(A) $a = 0$

(B) $b = 0$

(C) $c = 0$

(D) $a = 0$ and $b = 0$

Since the slope is given as $-\frac{2}{3}$, we may use delta y equals -2 and delta x equals 3. Then from point (0, 1) delta y tells us to go down 2 and delta x tells us to go to the right 3. This brings us to (3, -1).

Proceed to question 23 below.

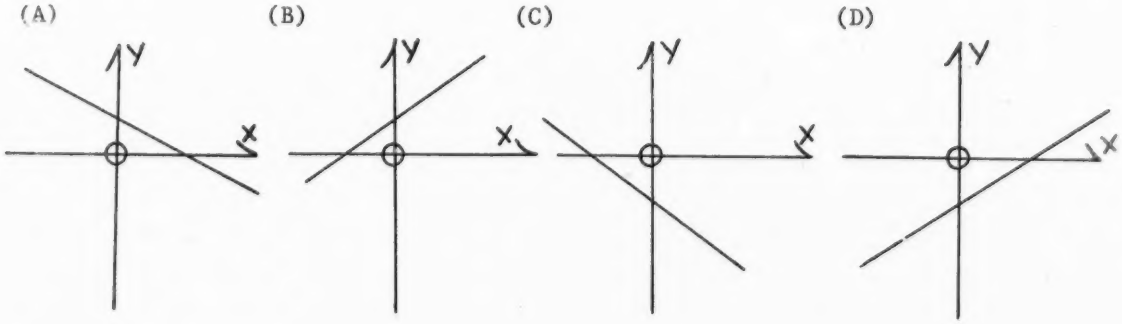
Question 23

Apply the principles of this lesson to draw the graph of the equation

$$y = -\frac{3}{4}x + 1$$

Which sketch below represents the graph of this equation?

(A) (B) (C) (D)



126
1

While this graph crosses the Y axis at a point (0, 4) whose coordinates fit the equation $x + y = 4$, it also passes through points such as (1, 4), which does not fit the equation.

Return to page 132/1 and try question 2 again.

126
2

The points which fit the inequality $y <$ some function of X , and a constant, if any are those points below the graph of the equation. While some of the points you have chosen fit this test others do not. In addition there are points which fit that are not included in your choice.

Return to page 142/1 and try question 9 again.

The graph crosses the X axis at a point (2, 0), whose coordinates do not fit the equation $y = x$.

Return to page 137/1 and try question 3 again.

In graphing an inequality " $x <$ " indicates " to the left of " and " $y <$ " indicates " below ". Since this graph does not meet both conditions, it is not the graph for this choice.

Return to page 140/1 and try question 11 again.

128
1

The point (0, -5) is on the line, not above it.

Please return to page 117/2 and try question 7 again.

128
2

This choice is correct.

Now proceed to question 6 which follows:

Question 6.

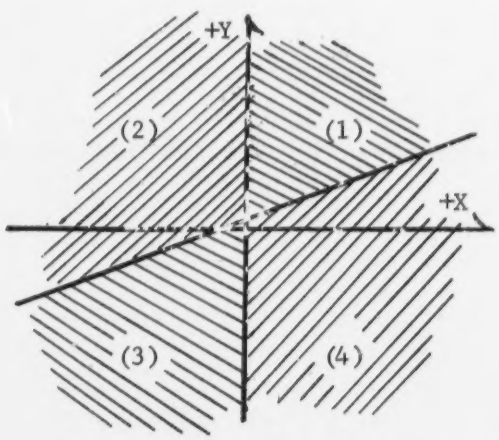
The graph shows the line whose equation is $y = \frac{2}{3}x + 1$. Apply your knowledge of inequalities to find the region which contains all the points whose coordinates satisfy the inequality $y > \frac{2}{3}x + 1$.

(A) (1)

(B) (1) and (4)

(C) (1) and (2)

(D) (3) and (4)



$\frac{129}{1}$

The graph crosses the Y axis at a point (0, 4) whose coordinates do not fit the equation $2x - 3y = 12$.

Return to page $\frac{149}{2}$ and try question 4 again.

$\frac{129}{2}$

Since the line $x = 1$ is parallel to the Y axis, $x < 1$ indicates points to the left of the line.

Return to page $\frac{139}{2}$ and try question 13 again.

130
1

In graphing an inequality " y $>$ " indicates " above ", and " x $>$ " indicates " to the right ". Since this graph does not meet both conditions, it is not the graph for this choice.

Return to page 140/1 and try question 11 again.

130
2

Region I does satisfy $x < -1$, but not $x > 2$.

Return to page 143/2 and try question 14 again.

If you locate this point on a graph with the line $x = 3y - 1$, you will find that it is to the right of the line, not to the left.

Return to page 145/1 and try question 8 again.

Two equations are said to be inconsistent when they have no common solution; that is, when the lines do not meet.

Return to page 120/1 and try question 1 again.

132
1

This choice is correct.

Now proceed to question 2 which follows:

Question 2

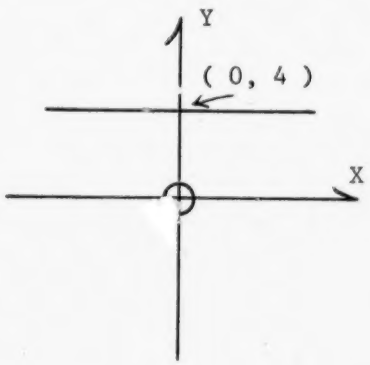
Which of the following do you recognize as the equation for the graph:

(A) $x = 4$

(B) $x = y$

(C) $y = 4$

(D) $x + y = 4$



132
2

If you substitute the coordinates of the point in each equation, you will find that this point does not check. Go back to your graph, there must be some mistake in it.

Please return to page 168/1 and try question 5 again.

The graph crosses the X axis at a point (-6, 0) whose coordinates do not fit the equation 2x - 3y = 12.

Return to page 149/2 and try question 4 again.

Since these two lines are parallel, they represent inconsistent equations.

Return to page 164/1 and try question 2 again.

$\frac{134}{1}$

If you locate this point on a graph of the line $y = x - 5$, you will find that it is below the line.

Return to page $\frac{117}{2}$ and try question 7 again.

$\frac{134}{2}$

In graphing an inequality, $<$ indicates below or to the left. This choice, therefore, does not fit the graph.

Return to page $\frac{141}{2}$ and try question 12 again.

$\frac{135}{1}$

This choice consits of points which are above the line. Clearly P does not fit here.

Return to page $\frac{148}{1}$ and try question 10 again.

$\frac{135}{2}$

In graphing inequalities, $<$ indicates below or to the left. Since this region does not meet both conditions, it is not correct.

Return to page $\frac{147}{2}$ and try question 15 again.

136
1

Since the line $y = 3$ is parallel to the X axis, $y \geq 3$ indicates points above the line.

Return to page 139 / 2 and try question 13 again.

136
2

Although lines I and II do not meet in the diagram, it is obvious that they will meet when extended. Therefore, they represent <u>consistent</u> and independent equations.

Return to page 156 / 1 and try question 3 again.

This choice is correct.

Now proceed to question 3 which follows:

Question 3

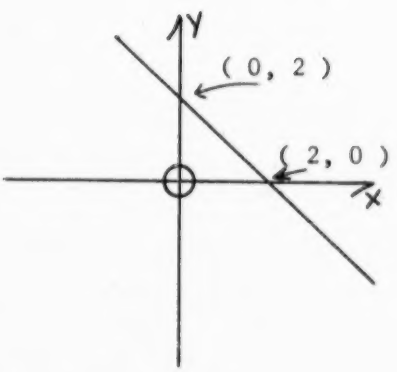
Choose the equation which fits the graph:

(A) $y = x + 2$

(B) $y = x$

(C) $y = x - 2$

(D) $x + y = 2$



The points which fit the inequality y are those points below the graph of the equation. Your choice is incorrect.

Return to page 142/1 and try question 9 again.

138
1

The graph crosses the Y axis at a point (0, 2), whose coordinates do not fit the equation y = x - 2.

Return to page 137 / 1 and try question 3 again.

138
2

Since the first graph shows lines which meet, they represent equations which are independent. Therefore, this choice is not correct.

Return to page 168 / 1 and try question 4 again.

All the points in region (I) do satisfy the inequality; but there are additional points that this choice omits.

Return to page 128/2 and try question 6 again.

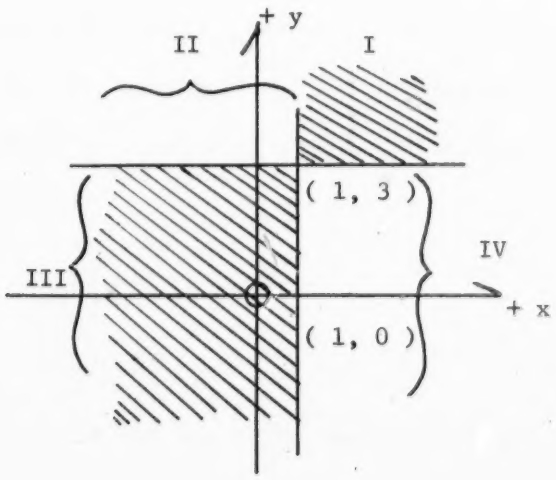
This choice is correct.

Now proceed to question 13 which follows.

Question 13

Apply your knowledge of inequalities to decide which region of the graph contains all the points whose coordinates satisfy both inequalities:

$x \leq 1, \quad y \geq 3$



(A) I

(B) II

(C) III

(D) IV

$\frac{140}{1}$

This choice is correct.

Now proceed to question 11 which follows:

Question 11

The graph shows the line whose equation is $x - y = 5$. The shaded area is the solution of two of the following inequalities. Apply your knowledge of inequalities to decide which two are correct.

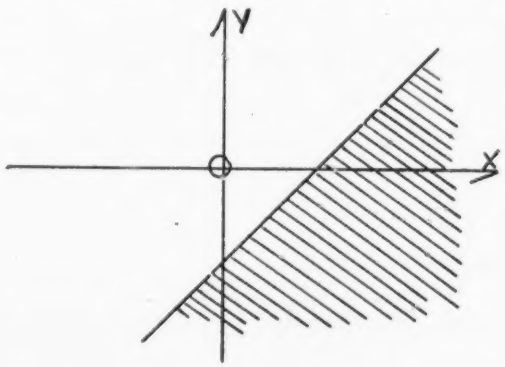
I. $x < y + 5$ II. $x > y + 5$ III. $y > x - 5$ IV. $y < x - 5$

(A) I and III

(B) II and III

(C) I and IV

(D) II and IV



$\frac{140}{2}$

If you made a correct graph for these equations, you should have two lines which meet in a point. One of the other choices gives the coordinates of the correct point of intersection.

Return to page $\frac{168}{1}$ and try question 5 again.

Region II satisfies neither of the inequalities.

Return to page 143/2 and try question 14 again.

This choice is correct.

Now proceed to question 12 which follows:

Question 12

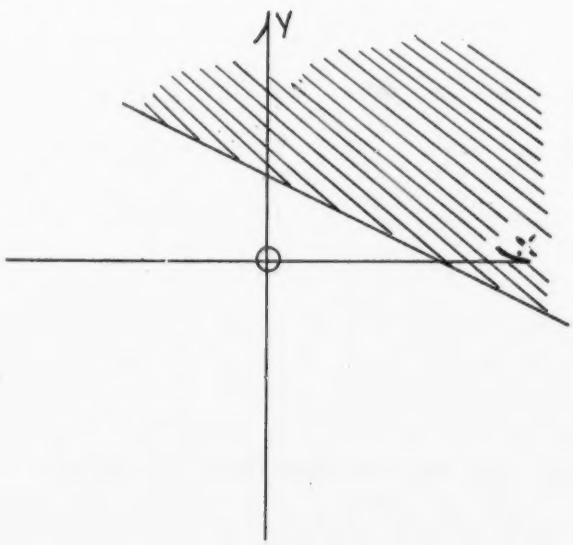
The graph shows the line whose equation is $x + 2y = 8$. Apply your knowledge of inequalities to decide which one has its solutions in the shaded region.

(A) $x \geq 8 - 2y$

(B) $y \geq 8 - \frac{x}{2}$

(C) $x \leq 8 - 2y$

(D) $y \leq 8 - \frac{x}{2}$



142
1

This choice is correct.

Now proceed to question 9 which follows:

Question 9

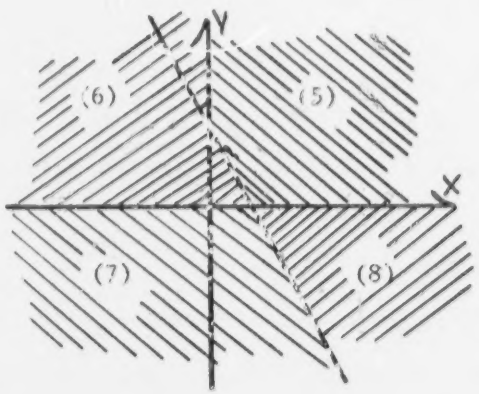
The graph shows the line whose equation is $y = -2x + 5$. Apply your knowledge of inequalities to find the region which contains all the points whose coordinates satisfy the inequality $y < -2x + 5$.

(A) 5 and 6

(B) 7 and 6

(C) 7 and 8

(D) 5 and 8



142
2

Two equations are said to be dependent when any solution of one is also a solution of the other. This occurs when the two lines coincide on the graph.

Return to page 120/1 and try question 1 again.

This choice contains points which fit the inequality, and others which do not fit. In addition, this choice omits points which do fit the inequality. Remember, greater than means either above or to the right on the graph.

Return to page 128/2 and try question 6 again.

This choice is correct.

Now proceed to question 14 below.

Apply your knowledge of inequalities to decide which region of the graph contains all the points whose coordinates satisfy both inequalities:

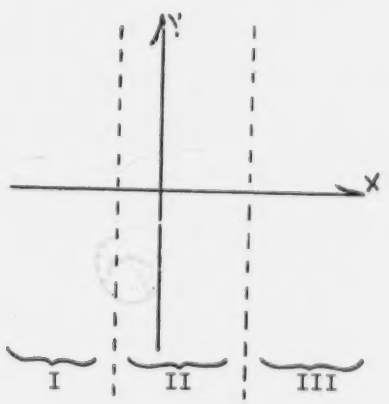
$$x > 2, \quad x < -1$$

(A) I

(B) II

(C) III

(D) none of these



144
1

The graph crosses the X axis at a point (6, 0) whose coordinates fit the equation $2x - 3y = 12$. It crosses the Y axis at a point (0, -4) whose coordinates also fit the equation $2x - 3y = 12$. Since the line passes through two points whose coordinates fit the equation, this is the correct equation.

Proceed to question 5 below.

144
2

Question 5

In order to draw the graph of the inequality $x - 2y \leq 5$, which do you recognize as the statement whose graph must first be drawn?

(A) $x \leq 5 + 2y$

(B) $y \geq \frac{x-5}{2}$

(C) $y \leq \frac{5-x}{2}$

(D) $x - 2y = 5$

This choice is correct.

Now proceed to question 8 which follows:

Question 8

If the inequality $x < 3y - 1$ is graphed, apply your knowledge of inequalities to decide which point is to the left of the line.

(A) (-1, 0)

(B) (-1, 1)

(C) (-1, -1)

(D) (0, -1)

Since these two lines meet at a point, they represent independent equations.

Return to page 164/1 and try question 2 again.

The graph shows that P is below the line. Therefore, a definite choice can be made.

Return to page 148/1 and try question 10 again.

In graphing inequalities, indicate below or to the left. Since this region is below the line $y = 2x - 5$ and to the left of the line $x = 0$, it is the correct choice.

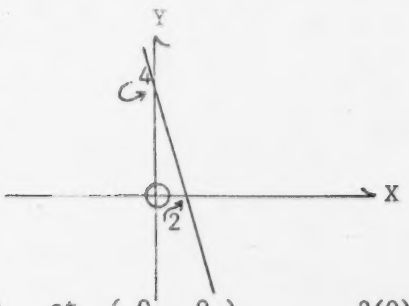
You have now finished this Segment. Hand in the PUNCH CARD.

You should have entered in your NOTEBOOK the following definitions and formulas:

(1) A line divides a plane into two half-planes
(2) To graph an inequality in linear form
  a) assume equality
  b) arrange in slope intercept form ($y = mx + b$)
  c) graph
  d) choose values for x and y, good choice (0 , 0), to determine proper half-plane.

Example: $2x + y \geq 4$

a) $2x + y = 4$
b) $y = -2x + 4$
c)

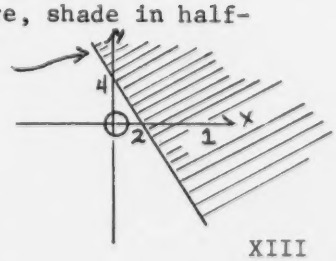


d) at (0 , 0) $\quad 2(0) + (0) \stackrel{?}{\geq} 4$

$0 \stackrel{?}{\geq} 4$ NO!

∴ (0 , 0) is not in half-plane and so, therefore, shade in half-plane not containing (0 , 0).

$y = -2x + 4$



You should do assignment 13, examples 9-12, before going ahead to segment 5. You will find question 1 of Segment 5 on page 120/1

Since it is impossible for a point to be to the right of the line $x = 2$ and <u>at the same time</u> to the left of the line $x = 1$, this is the correct choice.

Proceed to question 15 below

<u>Question 15</u>

Apply your knowledge of inequalities to decide which region of the graph contains all the points whose coordinates satisfy both inequalities:

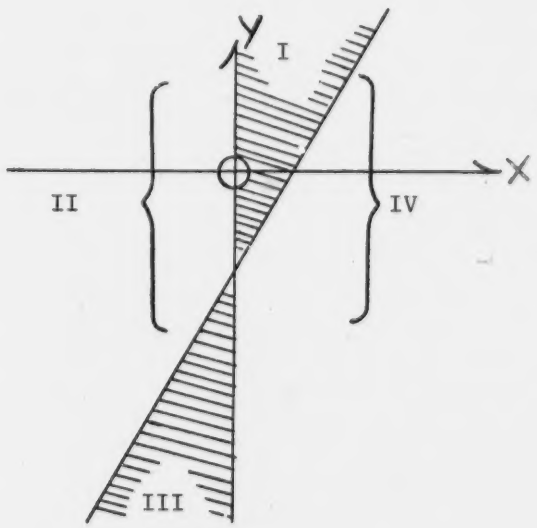
$$y \leq 2x - 5 \text{ , } x \leq 0$$

(A) I and II

(B) II

(C) III

(D) I and IV



148
1

This choice is correct.

Now proceed to question 10 which follows:

Question 10

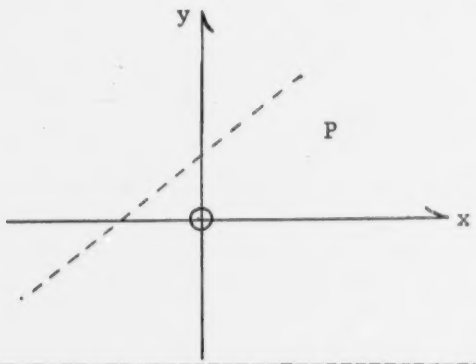
The graph shows the line $y = \frac{1}{2}x + 2$. Point P is a point in the solution set of $y \; ? \; \frac{1}{2}x + 2$. Apply your knowledge of inequalities to decide which sign is the proper replacement for the question mark.

(A) $<$

(B) $\geq$

(C) $>$

(D) it is impossible to choose



148
2

Since lines III and IV meet, they represent consistent and independent equations.

Return to page 156/1 and try question 3 again.

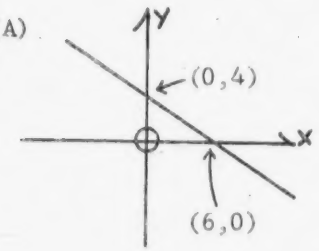
The graph crosses the X axis at a point (2, 0) whose coordinates fit the equation x + y = 2. It crosses the Y axis at a point (0, 2) whose coordinates also fit the equation x + y = 2. Since the line passes through two points which fit the equation, this must be the correct equation.

Proceed to question 4 below.

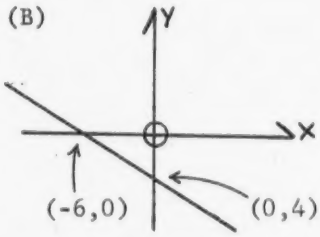
Question 4

Choose the graph which fits the equation 2x - 3y = 12.

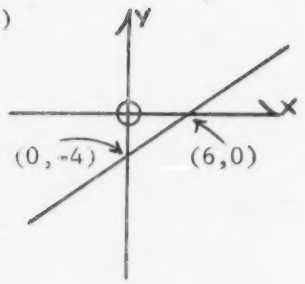
(A)



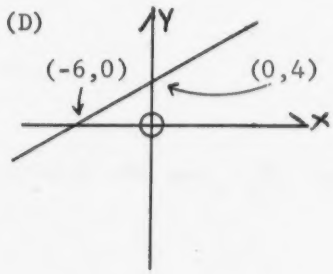
(B)



(C)



(D)



150
1

If you substitute the coordinates of the point in each equation, you will find that this point does not check. Go back to your graph; there must be some mistake in it.

Return to page 172/1 and try question 7 again.

150
2

Since the point where the lines cross is clearly not on the X axis, its Y value cannot be 0.

Return to page 170/1 and try question 8 again.

This choice is correct.

Now proceed to question 6 which follows:

Question 6

Apply the procedures you have learned to graph $2x + y = 10$ and $x = 6$ on the same set of axis. The point where the lines intersect is

(A) (6, 22)

(B) (6, 2)

(C) (6, -2)

(D) none of these

If your graph showed two lines meeting in a point, you have made a serious mistake, and you should plot the graph again.

Return to page 165/2 and try question 11 again.

152
1

Region III does satisfy $x > 2$, but not $x < -1$

Return to page 143
2 and try question 14 again.

152
2

Since the point of intersection is in quadrant II, its Y value is positive. Therefore, this choice is not correct.

Return to page 162
2 and try question 9 again.

The word equivalent refers to two different sets of two equations. If the common solution of the first set is the same as the common solution of the second set, the two sets are equivalent. Graphically, this means that the four lines all meet in one point.

Return to page 120/1 and try question 1 again.

This choice means that the lines are separate, parallel lines. If your graph is drawn correctly, you will see that this is not so.

Return to page 158/2 and try question 12 again.

154
1

Since all the points in this choice are below the line, they do not fit the inequality.

Return to page 128 (2) and try question 6 again.

154
2

If you substitute the coordinates of this point in each of the equations, you will find that this point does not check.

Return to page 171 (1) and try question 10 again.

Since the second graph shows parallel line, they represent equations which are inconsistent. Therefore, this choice is not correct.

Return to page 168/1 and try question 4 again.

This choice means that the lines are separate but parallel. If your graph is drawn correctly, you will see that this is not so.

Return to page 169/2 and try question 13 again.

156/1

This choice is correct.

Now proceed to question 3 which follows:

Question 3

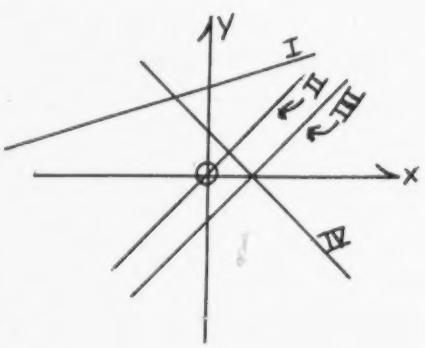
Which pair of lines do you recognize as representing two inconsistent equations?

(A) I and II

(B) II and III

(C) III and IV

(D) I and III



156/2

If you have made your graph carefully, you should be able to see from the graph that the point of intersection does not have the x value in this choice.

Return to page 160/2 and try question 15 again.

If you substitute the coordinates of this point in each equation, you will find that this point does not check. Go back to your graph; there must be some mistake in it.

Return to page 151/1 and try question 6 again.

The coordinates of this choice do not satisfy the two equations. If you made your graph carefully, you would see that this point is not correct.

Return to page 172/2 and try question 14 again.

158
1

If you constructed the graphs correctly, you have found that the two lines are parallel. Therefore, this is the correct choice.

Now proceed to question 12 below.

158
2

Question 12

Construct the graphs of $2y = x - 3$ and $2x - 4y = 6$ on the same set of axes. Apply your knowledge of graphs to determine the number of points of intersection.

(A) 0

(B) 1

(C) infinite

(D) none of these

Although lines I and III do not meet in the diagram, it is obvious that they will meet when extended. Therefore, they represent consistent and independent equations.

Return to page 156/1 and try question 3 again.

This choice means that the lines are not separate, but that they coincide. There are then an infinite number of points which are on both lines at the same time. If your graph is drawn correctly, you will see that the lines do not coincide.

Return to page 169/2 and try question 13 again.

160
1

This choice means that the lines are separate, intersecting line. If your graph is drawn correctly, you will see that this is not so.

Return to page 158/2 and try question 12 again.

160
2

This choice is correct.

Now proceed to question 15 which follows:

Question 15

Construct the graphs of $3x - 5y = 8$ and $2x + 4y = 1$ on the same set of axes. Apply your knowledge of graphs to determine the coordinates of the point of intersection, as accurately as possible.

(A) (1 , - .5)

(B) (2 , - 1)

(C) (1.5 , - .5)

(D) (1.7 , - .6)

If you made a correct graph for these equations, you should have two lines which meet in a point. One of the other choices gives the coordinates of the correct point of intersection.

Return to page 151/1 and try question 6 again.

Since the point where the lines cross is clearly not on the Y axis, its X value cannot be 0.

Return to page 170/1 and try question 8 again.

162
1

The point of intersection is (3 , - 1) or very close to it. Since none of the other choices listed this, you are correct in choosing this.

Proceed to question 9 below.

162
2

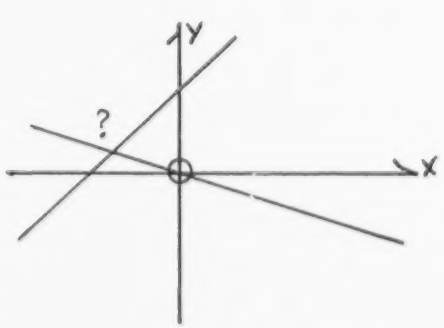
Question 9

Perform the necessary steps to find the coordinates of the point where the lines intersect.

(A) (-3 , -1)

(B) (-3 , 1)

(C) (-4 , 3)



(D) none of these

If you look carefully at the graph, you will discover that one line crosses the X axis close to -4 ; therefore, the point of intersection cannot be at -4 , since it is to the right of the point where the line crosses the X axis.

Return to page 162/2 and try question 9 again.

This choice means that the two lines coincide. If your graph is correct it does not show that this is true.

Return to page 165/2 and try question 11 again.

164
1

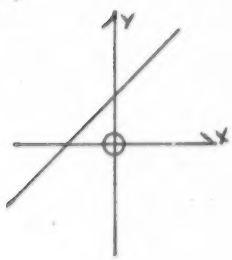
This choice is correct.

Now proceed to question 2 which follows:

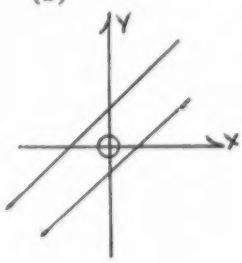
Question 2

Which graph do you recognize as representing two dependent equations?

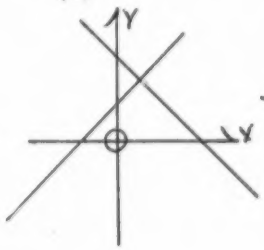
(A)



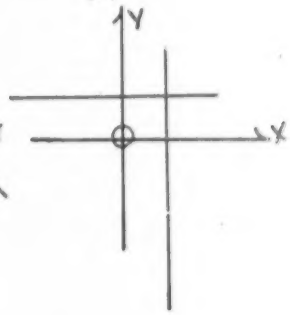
(B)



(C)



(D)



164
2

If you made a correct graph for these equations, you should have two lines which meet in a point. One of the other choices gives the coordinates of the correct point of intersection.

Return to page 172/1 and try question 7 again.

If you substitute the coordinates of this point in each equation, you will find that this point does check. You must realize that it is not possible to read values exactly from a graph. Read the value as carefully as possible, and then check by substituting.

Proceed to question 11.

Question 11

Construct the graphs of $x + y = 2$ and $2x + 2y = 5$ on the same set of axes. Apply your knowledge of graphs to determine the number of points of intersection.

(A) 0

(B) 1

(C) infinite

(D) none of these

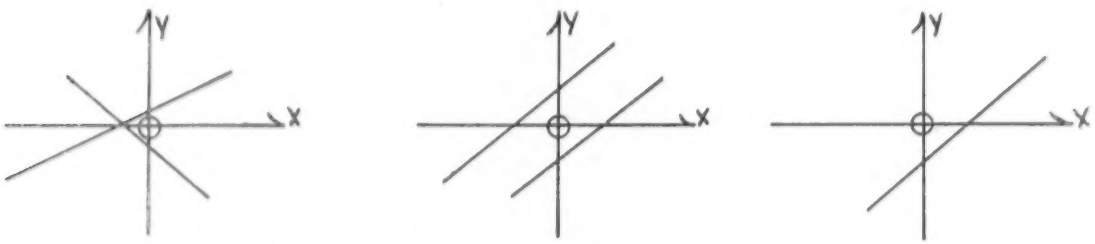
166
1

This choice is correct.

Now proceed to question 4 which follows:

Question 4

Each of the graphs represents one of the three cases of simultaneous equations: I. dependent II. independent III. inconsistent. In which order do you recognize the following graphs to be?



(A) I, II, III (B) III, II, I (C) II, I, III (D) II, III, I

166
2

Two lines in a plane always meet one of the following conditions:

1. they are separate but parallel - no intersections
2. they meet - one intersection
3. they coincide - an infinite number of intersections.

Therefore, this choice could never be correct in a question of this sort.

Please return to page 169/2 and try question 13 again.

Two lines in a plane always meet one of the following conditions:

1. they are separate but parallel - no intersections
2. they meet - one intersection
3. they coincide - an infinite number of intersections

Therefore, this choice could never be correct in a question of this sort.

Return to page 158/2 and try question 12 again.

From your graph it should appear that the point of intersection is very close to the one listed. However, if you check further, you will discover that another choice is closer.

Return to page 160/2 and try question 15 again.

168
1

This choice is correct.

Now proceed to question 5 which follows:

Question 5

Apply the procedures you have learned to graph $2x - y = 1$ and $y = 5$ on the same set of axes. The point at which the lines intersect is:

(A) (-2 , 5)

(B) (2 , 5)

(C) (3 , 5)

(D) none of these

168
2

Since the point (1 , 3) is 1 unit to the right of the Y axis this is not the correct choice.

Return to page 170/1 and try question 8 again.

This choice means that the lines are not separate, but that they coincide. There are then an infinite number of points which are on both lines at the same time. This is, therefore, the correct choice.

Proceed to question 13 below.

Question 13

Construct the graphs:

1) $x + 3y = 49$

2) $5x - 7y = 12$ . . . on the same set of axes.

Apply your knowledge of graphs to determine the number of points of intersection

(A) 0 (B) 1 (C) infinite (D) none of these

170
1

This choice is correct.

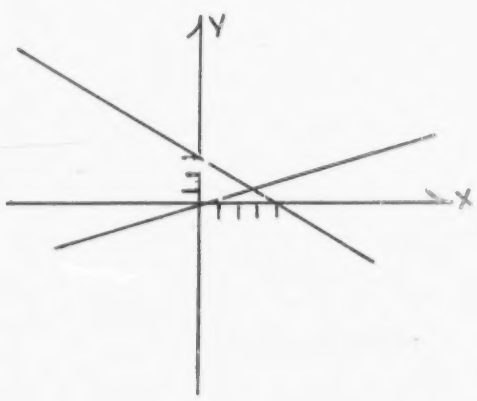
Now proceed to question 8 which follows:

Question 8

Perform the necessary steps to find the coordinates of the point where the lines intersect.

(A) (4 , 0) (B) (1 , 3)

(C) (0 , 4) (D) none of these



170
2

The point where the lines intersect has coordinates which are correctly listed in one of the other choices.

Return to page 162/2 and try question 9 again.

Two lines in a plane will always meet one of the following conditions:

1. they are separate but parallel - no intersections
2. they meet - one intersection
3. they coincide - an infinite number of intersections

Therefore, this choice could never be correct in a question of this sort.

Return to page 165/2 and try question 11 again.

This choice is correct.

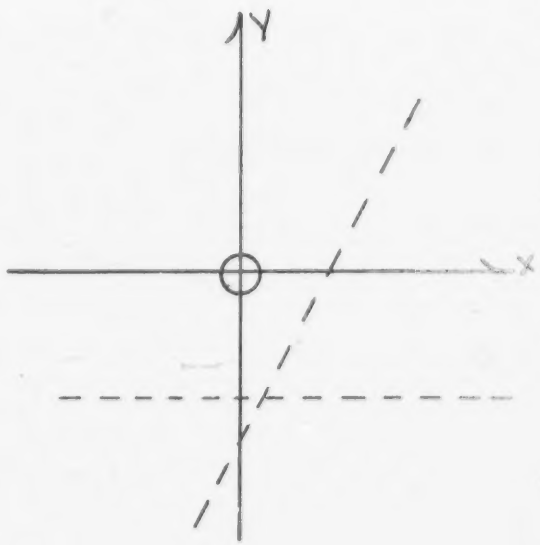
Now proceed to question 10 which follows:

Question 10

The graph shows the lines $2x - y = 4$ and $y = 3$. Apply your knowledge of graphs to determine which is the point of intersection.

(A) (1 , -3) (B) (0 , -3)

(C) ($\frac{1}{2}$, -3) (D) ($\frac{2}{3}$, -3)



172
1

This choice is correct.

Now proceed to question 7 which follows:

Question 7

Apply the procedures you have learned to graph $x - y = 2$ and $2x + y = 4$ on the same set of axes. The point where the lines intersect is

(A) (2 , 0) (B) (0 , 4) (C) (0 , -2) (D) none of these

172
2

This choice is correct.

Now proceed to question 14 which follows:

Question 14

Construct the graphs of $x - 2y = 4$ and $2x + y = 3$ on the same set of axes. Apply your knowledge of graphs to determine the coordinates of the point of intersection.

(A) (2 , -1) (B) (3 , 0) (C) (2.5 , -.5) (D) (2.2 , -.8)

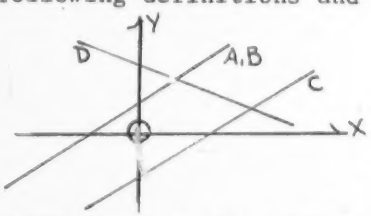
If you made your graph carefully, you might think that the point of intersection has these coordinates. However, it is important to remember that you cannot read numbers exactly from a graph. While this point is very close to the actual point of intersection, it is necessary to substitute the values in both equations to be sure.

This is not the correct choice.

Return to page 172/2 and try question 14 again.

This point is certainly close to the correct point of intersection as shown by your graph. However, only a substitution of values in the equations will find the best choice in this problem. The values in this choice do not check perfectly, but they are very close. If you check the values in the other choices, you will find that the error is greater. Therefore, this choice is correct because it is the best choice.

You should have entered in your NOTEBOOK the following definitions and formulas:



(1) Two lines are either:
- (a) coinciding, ex. A & B
- (b) parallel, ex. A & C
- (c) intersect, ex. C & D

(2) When there is more than one equation necessary to solve a problem, we have the condition known as simultaneous equations.

$$\text{ex.} \quad 2x + y = 4$$
$$x + 3y = 6$$

(3) Two linear simultaneous equations are called:

- (a) dependent, if they coincide when graphed.
- (b) inconsistant, if they are parallel when graphed.
- (c) independent, if there is a point of intersection when graphed.

You have completed this volume. You should now do assignment 13, examples 13 - 16.

If you have not done the optional segment, you should have all 20 examples completed in preparation for the examination.

Although the test will not require any knowledge from segment 3, you will be able to make use of it if you wish.

You are now advised to review all of your notes and to re-read the reading assignment in order to prepare yourself for the volume test.